COÖRDINATED MOTOR-RAIL-STEAMSHIP TRANSPORTATION

By G. LLOYD WILSON, Ph.D.

Professor of Commerce and Transportation, Wharton School of Finance and Commerce, University of Pennsylvania.

"The thesis presented and supported in this volume is that the interests of the shipper, the carriers, and the public are best served if each instrumentality of transportation is used in the services to which it is especially fitted and for which it is most efficient and economical. The place of each agency is definitely ascertained by experiment, analysis, and adjustment, and not by *a priori* reasoning. There should be a careful examination of the claims of each type of carrier, with the best interests of the public as the ideal. This has been here attempted."

APPLETON'S TRANSPORTATION SERIES

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Professor of Commerce and Transportation, Wharton School of Finance and Commerce, University of Pennsylvania; Author of "Traffic Management" and "Motor Traffic Management," and Co-Author of "Principles of Transportation," etc.

Before the war our transportation agencies were required to compete; now they are encouraged to coöperate. Because of this the moulding of all transportation facilities into a unified and universal system is the most important topic in the industry today. This book presents the first description of what has been done toward motor-rail-steamship coördination, what are the results, and what are the future objectives and possibilities. It pictures the rise of a gigantic transportation network, of which railroads and steamship lines must be the main strands, but which will be supplemented and rendered flexible by the use of motor cars and aircraft.

Professor Wilson, who is a recognized authority on the subject, has written earlier books and innumerable articles on motor and rail transportation. Here, concerning himself with a problem of vast dimensions, he has done a concise, logical and highly remarkable work.

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ILLUSTRATED

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TO

THE RAILROAD OPERATORS, AUTOMOTIVE ENGINEERS AND TRANSPORTATION ECONOMISTS WHOSE VISION AND EFFORT ARE PRODUCING AN IMPROVED TRANSPORTATION SYSTEM

THIS VOLUME IS DEDICATED

PREFACE

THE years following the entry of the United States into the World War have been replete with revolutionary changes in commerce and industry in all of the leading countries of the world. These changes have been particularly rapid and sweeping in the United States. New methods and processes have swept the field of production. Mass production, the keystone of the industrial system of the United States, is passing, and in its stead a new system is emerging. Mass production emphasized standardization of product and mass movement of freight. Speed was desirable but not imperative.

A new industrial system which emphasizes distribution, adjusts production to meet the requirements of markets, and replaces standardization of product with frequent style changes is replacing the old system. Reduced inventories, rapid style changes, and "hand-to-mouth" buying are possible only through improved transportation service. The railroads, steamship lines, and express companies of the United States have improved their schedules in order to meet the requirements of industry, and the motor truck is used by industries and in common carrier service to move goods at the pace required. In fact, the revolution in production and distribution has been made possible only through improvements in transportation. This is truly the "Distribution Age," and effective distribution is dependent largely upon rapid and efficient transportation.

The transportation system of the United States is being made over to coördinate the services of all available instru-

mentalities of transportation so as to serve the new requirements of high speed commerce. This adjustment has been made possible, and at the same time has been complicated, by the automotive highway carrier, the lusty infant of the American transportation family. No plans for the future of American transportation are complete unless this vitally important member of the family is considered as a permanent addition to the group, eager to find its sphere of maximum usefulness and greatest efficiency.

The Interstate Commerce Commission in its instructive report upon "Motor Bus and Truck Operation" states that: "The economic structure of the United States progresses almost directly in relation to the development and efficient functioning of its transportation facilities. Settlements in the beginning were chiefly on or near the coast or on navigable waterways. The steam railroad prepared the way for the peopling of vast domains and afforded ready communication between the different parts of the country. The first railroad enterprises met with opposition from existing forms of transportation and the value and utility of the railroad as an agency of commerce and communication was not immediately recognized.

"The era of railroad expansion marked the beginnings of great industrialization. Industrial centers were linked together and distribution throughout the vast areas of the country was made possible. Without such a transportation system the present industrial development could not have been attained. Then came the electric railway. There was needed, however, some agency which would permit the fullest development of the country's economic situation by permitting transportation and communication to reach remote communities through territory not able to support costly railroad facilities. This need has been supplied by motor vehicle transportation, flexible and composed of small units, so that many remote communities are now served by such

agencies and enjoy the benefits of practically direct rail service."

The thesis presented and supported in this volume is that the interests of the shipper, the carriers, and the public are best served if each instrumentality of transportation is used in the services to which it is especially fitted and for which it is most efficient and economical. The place of each agency is definitely ascertained by experiment, analysis, and adjustment, and not by *a priori* reasoning. There should be a careful examination of the claims of each type of carrier, with the best interests of the public as the ideal. This has been here attempted.

The author alone accepts the responsibility for the point of view expressed in this volume, but he is indebted to many fellow workers and fellow students in the field of transportation for much of the factual content. Painstaking effort has been maintained to guard against prejudice and errors in fact, but in treating a field as large and important as the one under discussion, and in attempting to analyze functions and methods that are at present in a state of flux, it is difficult to avoid falling into occasional error. It is to be hoped that such mistakes as may have been made are in details and not in principles.

It is impossible to mention all those who have contributed information, points of view, ideals, and ideas. The author, however, wishes to thank especially and to acknowledge the contributions of those who have read, criticized and corrected manuscript, furnished data, and have permitted the use of manuscript and encouraged the author by their advice and constructive criticism. These men include representatives of railroad companies, steamship lines, and motor transportation companies, engineers, economists, shippers, and attorneys. A few of those who should be mentioned by name are: Professor Emory R. Johnson, Dean of the Wharton School of Finance and Commerce,

University of Pennsylvania; Professor Joseph H. Willits, Professor of Geography and Industry and Director of the Industrial Research Department, University of Pennsylvania; F. C. Horner, Assistant to the President, General Motors Corporation; H. A. Palmer, Editor and Manager, *The Traffic World;* B. F. Fitch, President, Motor Terminals Company; Donald Blanchard, Editor, *Operation and Maintenance;* J. F. Murphy, Vice President, Columbia Terminals Company; Norman G. Shidle, Directing Editor, *Automotive Industries;* E. C. Loomis, Secretary, Motor Truck Committee, National Automobile Chamber of Commerce; E. J. C. Finch, President, Canadian Industrial Traffic League, and Traffic Manager, Imperial Oil Company, Limited; R. A. C. Henry, Director, Bureau of Economics, Canadian National Railways; H. W. McLeay, General Secretary, Canadian Industrial Traffic League; W. C. Thompson, Traffic Manager, Goodyear Tire and Rubber Company, Ltd., of Canada; W. T. Jackman, Professor of Economics, University of Toronto; J. W. Roberts, Assistant Vice President, Pennsylvania Railroad; G. C. Woodruff, Assistant Freight Traffic Manager, New York Central Railroad; R. K. Stackhouse, General Superintendent of Stations and Transfers, Pennsylvania Railroad; Nat Duke, General Freight Traffic Manager, Delaware, Lackawanna & Western Railroad; A. H. Hamilton, Vice President, Central Railroad of New Jersey; W. F. Richardson, Freight Traffic Manager, Baltimore & Ohio Railroad; W. F. Banks, President, Motor Haulage Company, Inc.; F. J. Scarr, Transportation Engineer, formerly Supervisor of Motor Service, Pennsylvania Railroad; F. J. Carey, Superintendent of Motor Transportation, Boston & Maine Transportation Company; W. H. Chandler, Traffic Manager, Merchants' Association, New York; A. E. Beck, Traffic Manager, Merchants' and Manufacturers' Association, Baltimore.

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G. L. W.

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COÖRDINATED MOTOR-RAIL-STEAMSHIP TRANSPORTATION

CHAPTER I

THE SIGNIFICANCE OF COÖRDINATED TRANSPORTATION

The coördination of objects is the bringing of the things associated into a definite order, the combination of several or many things into unified, harmonious action; thus, to coördinate automotive with other transportation instrumentalities is to bring the several agencies into harmonious relationship and unity of service. The coördination of motor truck and motor bus service with that of steam railroads, electric railways, steamship lines, and with other motor carriers implies the adoption of the motor carrier into a general system of transportation upon a common basis with all other carriers, so that all, by united action, may render more efficient service. The end to be achieved is the movement of persons and goods more rapidly and efficiently and at smaller cost to the operators of each service and to those who pay for and use the services, travelers and the shippers and consignees of freight.

The goal for all, the operators of the railroads, the electric railways, the steamship lines, the motor carriers, the shippers and receivers of freight, and also the general public, is the same. In this, as in every other transportation problem of national importance, all concerned have a common, although not necessarily an identical, interest. To assure adequate transportation service at rates that are fair to the producers and consumers of transportation is the common aim.

The result to be attained is a national, privately owned, publicly regulated transportation system in which each unit occupies its proper place. The position of each facility in the transportation system should be determined by the relative efficiency with which each performs its particular service. If it be definitely established that motor trucks haul freight and that motor busses transport passengers for short distances more economically than steam railroads, electric railways, steamship lines or other carriers, then the development of motor transportation in short-haul traffic should be encouraged, and railroad, electric railway and steamship facilities should be devoted to the service of hauling the steadily increasing volume of long-haul freight and passenger traffic. To do otherwise is to defy common sense, and to ignore the sound principle that a strong economic system is based upon the most efficient utilization of the productive factors.

The Motor and Coördination

The coördination of transportation does not necessarily mean that the motor carriers will be relegated to a position of minor importance in the transportation system, or that all motor truck and bus lines will be controlled by railroads or by other carriers. Coördination, which implies only the union of various classes of carriers to improve the efficiency of transportation, may be achieved through independent ownership and operation of motor vehicles as well as by the ownership and operation of motors by railroads and steamship lines or by subsidiaries of the rail and steamship companies. Many who fear that railroad or steamship ownership of motor vehicles will impair the motor's usefulness and check its development, have expressed the belief that the rail and steamship carriers seek through coördination to limit motor services to those which were performed by the horse and wagon before the advent of the automo-

bile, and that the railroads and steamship lines seek to recapture and continue to control all the services they performed before the motor vehicle entered into competition with them.

There is no basis for the opinion that this uneconomical division of the field of transportation will be brought about through the coördination of motor facilities with other transportation agencies. The motor vehicle has become a permanent part of the transport system of this and other countries. The railroads, electric railways, and steamship companies realize this fact as fully as do the shippers and the general public. Many railroads are actively engaged in working out plans to extend the use of motor vehicles in local or way freight stations, in performing certain terminal operations by motor where motor service is more economical than rail, in developing plans of using motors in station delivery services, and even in abandoning certain fields of transportation entirely to the motor carrriers. Certain railroads have made arrangements with independent motor operators to perform these services; in other instances, separate subsidiary companies have been organized to operate the motor services, and in a few cases, railroads are operating their own trucks and busses directly. In no case has there been an attempt to limit the use of the motor truck to what was once done by horse and wagon.

The coördination of rail and motor transportation may be brought about without the railroads having any direct or indirect financial interest in the motor carriers. Joint through rates and services by rail and motor routes will do much to establish a satisfactory system of coördination. This can be brought about through the joint action of the railway and motor carriers, under common regulatory control, without any community of financial interest between the carriers, just as through rates and routes are now made by joint rail, rail-and-water and all-water carriers.

The railroads in the United States are carrying certain classes of short-haul less-than-carload freight at rates that do not cover their out-of-pocket costs. It has been estimated that it costs the average railroad between 27 and 30 cents to perform the terminal services at both ends for a less-than-carload shipment.[1] Unfortunately there are no uniform costs figures avaliable for all railroads of the United States. As a matter of fact, the lack of uniformity in methods of keeping costs by railroads makes accurate comparison of costs very difficult, and often quite valueless. There is usually no common denominator.

A comprehensive study was made in 1924 of railroad freight terminal costs in the St. Louis terminal district. Accurate comparisons were found difficult due to the diverse methods of cost keeping maintained by the agents of the roads serving the district.[2] Similar variations are found in the methods of cost keeping used by motor operators, and it is often impossible to say just what freight should be handled by motor and what should be transported by the railroads, and thus it cannot be asserted that one carrier or the other is the more efficient in all terminals and under all conditions. The problem must be analyzed in each district and for each carrier.

Coördination of Carriers Advocated by the Chamber of Commerce of the United States

The most constructive statement of the appropriate field of the motor vehicle in national transportation that has been published thus far is the report of a special committee appointed by the Chamber of Commerce of the United

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[1] Testimony presented by rail carriers in the Southern Class Rate Investigation, reported in 100 I.C.C. 513.

[2] Charles E. Smith, "The Railroad Freight Terminal Problem in St. Louis, Missouri," *Transactions American Society of Civil Engineers*, Vol. LXXXVII, 1924, p. 740.

States to study the problem of the relationship of motor and other transportation facilities. This committee included representatives of motor manufacturing companies, motor operating companies, railroads, a coastwise steamship line, a public utility corporation, a shippers' organization, an editor and the traffic manager of an industrial company. Dean Emory R. Johnson of the Wharton School of the University of Pennsylvania advised the committee as transportation expert.[3]

This committee reported in 1923 that the best interests of the public and the rail, water, and motor carriers lay in coöperation between the various agencies of transportation rather than in unrestrained competition among them. The committee reported that the greatest opportunity for cooperation among the carriers was to be found at the points where the capacity of the railroads is most limited and expansion is most difficult and costly, that is, in the terminal areas of the larger cities. The trucking of freight between steam railroad depots, electric railway stations and steamship piers and the places of business of shippers and consignees by motor vehicles, which would relieve congestion in these terminal areas and greatly increase the capacity of the freight stations, was found to be the greatest contribution that can be made to the solution of the terminal problem.

Organized motor transportation was recommended as a means of relieving the railroads of various forms of uneconomical service such as trap or ferry car service, switching between local stations and short-haul shipments within the terminal area, which are sometimes performed far more economically by motor than by rail. The use of motor vehicles for freight cars in these services would tend to

[3] "Relation of Highways and Motor Transport to Other Transportation Agencies," Chamber of Commerce of the United States (Washington, November 2, 1923).

reduce yard congestion and release many railroad cars for more profitable line-haul service.

In order to facilitate the coördination of motor transportation agencies, the committee also recommended that to secure the fullest benefit from an organized motor transportation system, it would be necessary to utilize and further develop modern technical equipment, such as demountable bodies, trailers and semi-trailers, containers and container cars, and mechanical handling appliances.

Outside of the terminal areas there are fairly well marked zones, varying in size in different localities and for different commodities, in which one type of carrier, the motor for short-haul and the railroad, electric railway or steamship for long-haul, is clearly more economical than the others, and intermediate zones in which competition is inevitable. In the competitive areas the interests of efficiency require that each carrier find its place according to its relative efficiency.

The motor vehicle also has a wide field of usefulness where there is no transportation facility available. Motor trucks and busses should be used to supplement the facilities of existing common carriers, wherever possible, and to provide facilities of a character not otherwise afforded.

It is in the public interest, as well as in the interest of the respective carriers, that the economic limitations of each type of carrier be recognized, that the railroads be permitted to discontinue unprofitable service to which the motor is better suited, and that the motor abandon its efforts to handle general traffic over distances that cause the costs of operation to be unduly high in comparison with those of other carriers.

The Chamber of Commerce committee found further that because the public welfare depends upon the operation of railroads, rail carriers have performed and must continue to render certain services that are unprofitable, chiefly

in territory where organized highway transportation would also be unprofitable. If the railroads are to be deprived by motor competition of a substantial share of their more remunerative traffic the tonnage remaining to the railroads must receive higher rates or the public will suffer from an impaired service. The conclusions of the committee were as follows:

In all cases where the railroad can handle traffic with greater or equal efficiency, all factors being considered, the public interest requires that it be allowed to do so. Unprofitable steam railroad service can in some cases be successfully replaced by the use of self-propelled railroad motor cars.

To insure to the public continuity and reliability of service, sound financial organization of motor transport is necessary, as well as public regulation of common-carrier motor service.

Passenger bus transportation should be so regulated as to secure the best service to the public, certificates of public convenience and necessity as already required in many states being a useful means of insuring reliable and continuous service. Rail lines can often advantageously extend or supplement their service by bus lines, and in states where this is now prohibited such restrictions should be removed. Regulation of traffic and of size, weight and speed of motor vehicles by states and municipalities having control should be made more uniform within states and as between states. Regulation of common-carrier operations of motor vehicles, including rate regulation, should be handled by the Federal or state authorities, under the commissions which now control the operations of rail and water carriers.

Trunk highways in any area should be able to carry the normal vehicular traffic of that area, and, if the traffic economically justifies the use of especially heavy trucks, highways with stronger subbases must be provided. This constitutes a problem requiring particular attention in the regulation of traffic. In other respects present types of highways, present routes connecting principal centers of population and production, and the present trend in size, weight and speed restrictions of vehicles using highways show a rational system of highway development that should be continued.[4]

[4] *Ibid.*, pp. 5-7.

The committee recommended that investigations be made by the United States Bureau of Public Roads of the Department of Agriculture, by state highway departments and other agencies to determine more fully the economic rôle of the motor vehicle in the transportation system.[5] The surveys of the Bureau of Public Roads, the Interstate Commerce Commission and public and private agencies have been especially valuable in delimiting the field of motor transportation with respect to other facilities.[6]

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[5] The personnel of the special committee of the Chamber of Commerce of the United States is given in footnote 7 below.

[6] I.C.C., Docket No. 18300.

[7] The personnel of Special Committee IV of the Chamber of Commerce of the United States included:

Alfred H. Swayne, Chairman–Vice-President, General Motors Corporation, New York

W. J. L. Benham, General Traffic Manager, Otis Elevator Company, New York

D. C. Fenner, Engineer and Manager, Public Works Department, Mack Trucks, Inc., New York

Gerrit Fort, Vice-President, Boston and Maine Railroad Co., Boston, Mass.

Philip H. Gadsden, Vice-President, United Gas Improvement Company, Philadelphia, Pa.

W. H. Lyford, Vice-President and General Counsel, Chicago & Eastern Illinois Railway Company, Chicago

Ralph H. Matthiessen, President, Motor Haulage Company, New York

John D. Miller, President, National Milk Producers' Federation, New York.

H. H. Raymond, President, Clyde Steamship Company, New York

Arthur T. Waterfall, Vice-President, Dodge Brothers, Detroit

Henry J. Waters, Editor, Weekly Kansas City Star, Kansas City

Robert C. Wright, General Traffic Manager, Pennsylvania Railroad System, Philadelphia

Emory R. Johnson, Transportation Expert and Dean of the Wharton School of Commerce and Finance, University of Pennsylvania, Philadelphia, Pa.

Charles W. Stark, Chief of the Highways and Waterways Bureau of the Chamber of Commerce of the United States, was secretary of the committee.

CHAPTER II

THE TERMINAL PROBLEM

THE movement of carload and less-than-carload freight in the terminals of the railroads of the United States has long been given consideration by railroad operating and traffic men, engineers and economists. It is the most important problem in American transportation and upon its successful solution depends the efficiency of the transportation system of this country. All agencies of transportation —the railroads, the transoceanic, coastwise and intercoastal steamship lines, the canal and inland waterway carriers, express companies, motor freight lines and even the air transportation companies are dependent for their efficient operation upon adequate terminal facilities and upon the prompt and economical movement of traffic into, out of, and through the terminals.

Freight transportation involves four services:

1. The collection of freight from individual shippers and its haulage to the initial carriers in the originating terminals.
2. The line-haul of the freight over the rails, waterways, highways, or through the air.
3. The distribution of the goods to individual consignees after arrival at the destination terminals.
4. The interchange of traffic between carriers in the terminals.

The first, third and fourth of these transportation services are those urgently in need of intensive study and improvement in the United States. The second is performed with an efficiency that is one of the distinguishing characteristics of the American transportation system.

Railroad Line-Haul Efficiency

The railroads of the United States have been particularly successful in hauling freight in carload quantities long distances at comparatively low rates per ton per mile. Low grade freight, including stone, brick, sand, coal, slag, grain, iron and steel products, ores and other products of the fields, factories, and mines, which in Europe are often carried by coasting steamer or by river or canal boat, are transported in this country in large quantities for long distances by rail or via combined rail-and-water routes.

The railroads of the United States are primarily carriers of goods in carload or trainload lots, more than 96 per cent of the tonnage of all revenue freight of Class I railroads moving in carload or in trainload lots. The relative efficiency of American railroads in the movement of carload freight for long distances is shown by the fact that the rates per ton-mile are very low compared with those in other countries. The average receipts per net ton-mile are only a little over one and a tenth cents. This average is especially significant when the general levels of prices in other countries are compared with those in the United States. Higher commodity prices prevail in this than in other countries while freight receipts per ton per mile are among the lowest. Exact comparisons of freight charges are impossible on account of fluctuating rates of exchange, and the impossibility of obtaining data for the same years for all countries. The rates shown in Table I are compiled from data collected by the Bureau of Railway News and Statistics.[1]

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[1] "Railway Statistics of the United States of America, year ending December 31, 1927," Bureau of Railway News and Statistics, Chicago, 1928.

TABLE I

RECEIPTS PER TON-MILE IN RAILROAD FREIGHT SERVICE

Figures reported by the Bureau of Railway News and Statistics, Chicago, Illinois, 1928

Country	Receipts per Ton-Mile Freight	Year	Remarks
United States	$.01088	1927	Bureau of Railway News and Statistics figures
Canada	.01022	1927	Roads with annual revenues of $500,000 or more
Great Britain	.02930	1927	Ireland not included
France	.01280	1913	Last comparable figure on pre-War monetary standard
Germany	.0163	1926	
Australia ...	.0372	1927	Year ending June 30, 1927
Norway	.0336	1926-1927	All railways
Sweden	.0215	1926	State railways
Brazil	.1147	1925	Last figures available
Argentine ...	.0265	1922	Last figures available
Japan	.0138	1926-1927	Imperial Government railways
China	.0208	1924	Last figures available

Terminal Inefficiency

Although the line-haul freight services of American railroads are, as a rule, efficiently organized, the terminal services are often otherwise.

Mr. F. J. Scarr, formerly Supervisor of Motor Service of the Pennsylvania Railroad System, in speaking of the importance of the coördination of rail and highway freight transportation within the terminal, has emphasized the fact that the terminal functions of consolidation and distribution of freight traffic are often inefficiently performed. "We are conducting transportation through what are, fre-

quently, inadequate facilities and antiquated methods, and inefficient terminal operation. These conditions are the result of the rapid growth of our cities with the consequent increased and more exacting demands and the lack of space to expand to meet new requirements. The advent of the new transportation tool [the motor] has temporarily added to the confusion."[2]

During the past twenty-five years there has been an increase of about 50 per cent in the population of the United States as a whole and an increase of 81 per cent in the population of the eighteen largest terminal cities of this country. During this same quarter century the number of miles of railroad line operation has increased 33 per cent and the miles of track, including second and other main tracks, yards and side tracks, have gained 61 per cent. Contemporaneous with these developments there has been a growth of 161 per cent in the tonnage of freight originated by rail carriers, and of 180 per cent in the amount of freight carried as expressed in ton-miles, *i.e.*, one ton of freight hauled one mile. Congestion in the terminal, the neck of the transportation bottle, is the inevitable result of these greater increases in traffic as compared with the increase in railroad facilities. Traffic is increasing faster than either the growth of population or the development of railroad mileage or trackage. Great progress has been made in improving the speed and efficiency of railroad freight services so that no transportation shortages have been noted in the past half dozen years.

Terminal congestion is augmented by economic and political causes other than the increase in volume of traffic and the growth of population. The railroad and steamship companies in their competition for inbound and outbound freight traffic have been compelled to establish large num-

[2] Address before the Fifth Annual Convention, Western Society of Engineers, Chicago, April 21, 1926.

bers of in-city terminals in or close to the important industrial and commercial districts in each major terminal area. As the character of the industrial and commercial districts is changed, and new areas are developed, new competitive facilities have been established adjacent to the industries, wholesale houses and retail shops to preserve the status of the rivalry of the various railroads serving the district.

The three rail lines serving the city of Philadelphia—the Pennsylvania Railroad, the Reading Company and the Baltimore and Ohio Railroad—have invested many millions of dollars in competitive terminal freight facilities. These three railroads operate 146 freight stations, more than 50 pier connections with steamship lines, over 1,000 miles of terminal rail trackage, while 1,300 private industrial sidings connect the rail lines with the factories, mills, warehouses and other business concerns in the district. Similar conditions are to be found in other large terminal areas.

In all major terminal zones there is an almost ceaseless movement and cross movement of traffic over the network of railroad tracks and over the streets of the cities, of traffic in railroad cars and in motor- and horse-drawn vehicles passing to, from and between those various stations and steamship piers, causing serious problems in traffic congestion.

The congestion of traffic in many leading terminal cities is due in part to the physical formations of the city sites. In New Orleans the cross currents of rail, Mississippi River, coastwise water and foreign ocean traffic surge through the old river front or levee districts, the direct result of years of fierce competition for both water and rail traffic in the area.

New York's water-girt terminal district is so congested with local delivery and passenger vehicular traffic that freight traffic has been forced to the Jersey and Brooklyn

TABLE II

THE GROWTH OF POPULATION OF THE UNITED STATES AND OF EIGHTEEN LARGEST CITIES, 1920-1925

As Reported in The United States Census Reports

City	1900	1925	Percentage Increase
Baltimore	508,957	796,296	56.4
Boston	560,892	781,529	39.3
Buffalo	352,387	538,016	52.6
Chicago	1,698,575	2,995,239	76.3
Cincinnati	325,902	409,333	25.6
Cleveland	381,768	936,485	145.3
Detroit	285,704	1,242,044	334.7
Los Angeles	102,479	1,222,500	1092.9
Milwaukee	285,315	509,192	78.4
Minneapolis	202,718	425,435	109.8
Newark	246,070	452,513	83.8
New Orleans	287,104	414,493	44.3
New York	3,437,202	6,251,817	81.8
Philadelphia	1,293,697	1,979,364	53.0
Pittsburgh	451,512	631,563	39.8
St. Louis	575,238	821,543	42.8
San Francisco	362,782	557,530	62.6
Washington, D. C.	278,718	497,906	78.6
TOTAL, 18 cities	11,617,039	21,084,337	81.5
TOTAL, United States	75,994,575	113,994,574	49.3

terminals. The delays sometimes incident to lighterage and car float deliveries have caused several of the carriers serving the terminal to use the facilities of local cartage companies to perform certain terminal services incident to the pick-up and delivery of merchandise freight between shippers and consignees on Manhattan Island and the railroad terminals across the rivers.

Down-town Chicago is such a dense traffic center that freight delivery services are often seriously impeded by the

TABLE III

Railroad Traffic Development, 1920-1925

Compiled from Annual Reports of the Interstate Commerce Commission

	1900	1910	1920	1925	Percentage Increase
Number of tons of freight originated by railroads in the United States. Excluding switching and terminal companies.	516,432,217	1,026,491,782	1,362,999,293	1,350,570,542	161
Number of tons of revenue freight carried by railroads in the United States. Excluding switching and terminal companies.	1,101,680,328	1,745,324,828	2,259,983,278	2,306,976,706	109

	1900	1910	1920	1925	Percentage Increase
Number of tons of freight hauled one mile. Excluding switching and terminal companies.	147,077,136,040	255,016,910,451	413,699,000,000	417,454,000,000	180
Railroad mileage ..	193,345	240,831	259,941	258,870	33
Total railroad trackage	258,784	351,767	406,597	418,189	61
Traffic density (ton-miles divided by railroad mileage)	760,414	1,071,086	1,748,451	1,749,197	120

TABLE IV

REGISTRATION OF MOTOR VEHICLES IN THE UNITED STATES

Figures 1895-1927 compiled from reports of the National Automobile Chamber of Commerce; figures for 1928, United States Bureau of Public Roads, Department of Agriculture.

Year	Passenger Cars	Motor Trucks	Total Motor Vehicles
1895	4	.....	4
1900	8,000	.....	8,000
1904	54,590	410	55,318
1905	77,400	600	78,000
1910	458,500	10,000	468,500
1915	2,309,666	136,000	2,445,666
1920	8,325,859	1,006,082	9,231,941
1921	9,346,195	1,118,520	10,464,715
1922	10,864,128	1,375,725	12,239,953
1923	13,479,608	1,612,569	15,092,177
1924	15,460,649	2,134,728	17,595,377
1925	17,512,638	2,441,709	19,954,347
1926	19,237,171	2,764,222	22,001,393
1927	20,230,429	2,896,886	23,127,315
1928	21,401,124	3,092,000	24,493,123

terrific congestion within the district. The large yards of the railroads within the section have so restricted commercial and industrial development that industries are seeking a place to expand outside the central area.

St. Louis is separated from the markets and sources of supply of the East by the Mississippi River. The terminals of the eastern rail lines are in East St. Louis, Illinois, across the river from St. Louis. Although the Eads and Merchants' Bridges now span the river, the western railroads had acquired most of the desirable freight station sites in St. Louis before the eastern roads crossed the river. The terminals of the eastern rail carriers are now connected as regards less-than-carload freight with "off-track" stations in the industrial and commercial districts of St. Louis by

the services of a local cartage and terminal freight handling company.

New industrial and business districts have developed rapidly on the heights back of the old river-front district in Cincinnati. The congestion of railroads and of freight and local vehicular traffic have made it necessary that a new method of handling freight be developed. The physical capacity of stations and yard tracks of the several railroads entering the city had to be increased, which would have entailed great expense, or a system of coördinated mail and motor freight services had to be developed to increase the velocity of traffic movement. The latter alternative was chosen and the Cincinnati Motor Terminals Company developed a comprehensive system of station and substation freight distribution service, connecting all railroad freight stations by means of motor facilities, used in the interchange of less-than-carload freight.

Pittsburgh, Chicago, New York, San Francisco, Baltimore, Boston, Philadelphia and other great terminals are seeking to alleviate terminal congestion by the development of plans to increase the speed of the traffic passing through the transportation arteries that bear freight traffic into, out of, or through their limits. Few cities of the United States were laid out upon a definite plan, and in the few cities where definite plans have been adopted, they have been changed as a result of later developments. Cities are not, as a rule, developing new plans in anticipation of the increase in the volume of freight traffic that is certain to come. The narrow and often tortuous streets of the older cities of the United States are often inadequate to carry the present volume of vehicular traffic, much less that which will result from future development. This is especially true in the streets leading to and from railroad freight stations which are usually in the oldest sections of the cities. Even the newer cities are failing, in many cases, to anticipate future

development by providing broad streets to accommodate traffic.

The cities of the United States are passing through a period in which literally hundreds of plans of traffic control are being tried in order to relieve the unbearable pressure of traffic in the city streets. Inadequate traffic control, while usually not a cause of the congestion in the larger terminals, is an important contributing factor, and ineffective enforcement of the regulations impairs the effectiveness of many systems of control that would otherwise be adequate.

The railroad freight station facilities, located in sections of cities where expansion is difficult and sometimes impossible because of prohibitively high real estate values, have not, as a rule, kept pace with the great increase in volume of traffic, either in the size of the stations or in mechanical freight handling devices. Time lost by trackmen due to street congestion and to waiting in lines at the freight stations is increased by the time consumed in locating and handling freight within the freight sheds due to inadequate station arrangement and equipment.

Wasteful transportation within the terminals contributes to terminal congestion. Railroad tracks within these districts are used for the movement, between industries and railroad stations, of trap and ferry cars often loaded to a small fraction of their capacities. Switching movements of carload freight from industry to industry are performed by the carriers often at flat rates per car made without regard to carload minimum weights. Freight cars instead of motor trucks are used to distribute less-than-carload traffic between stations and substations of the same road and for interchange service between stations of different roads. Few of the freight cars used in these terminal services are loaded to their carrying capacities or even to the minimum carload weights required in line-haul services. These

wasteful uses of railroad freight cars tend to congest the movement of inbound, outbound and through carload traffic within the terminals.

There is no panacea that will solve all the problems of freight congestion within terminal districts. Each city has its own peculiar physical and traffic characteristics which must be considered in working out a plan to relieve the situation. The more important remedial steps to be taken may be summarized as follows:

1. The widening of arterial streets and the construction of special highways for freight traffic to and from terminals of the railroad carriers serving the terminals.
2. The segregation of high speed vehicles from slow speed traffic on the arterial highways.
3. The establishment and improvement of girdling boulevards to avoid the necessity of through traffic passing through the congested streets of the terminals.
4. The improvement of systems of traffic control, and the proper enforcement of the system.
5. The elimination of parking in narrow streets during hours of congestion.
6. The improvement of belt line switching facilities for carload freight traffic, so as to give shippers in all sections of the terminals access to the lines of all carriers upon equal bases of rates and services.
7. The establishment of modern freight terminals, in outlying sections of the cities out of the congested down-town districts, for handling inbound and outbound less-than-carload traffic and general merchandise traffic.
8. The development of coördinated rail and motor delivery and pick-up services for handling less-than-carload freight between outlying railroad freight stations and "off-track" stations within the terminals, or between the outlying terminals and the stores of merchants and the warehouses of industries within the terminals.
9. The improvement of coördinated cartage service, so that the amount of freight per truck can be increased. A recent survey in one large terminal showed that trucks are now used at less than 40 per cent of their carrying capacities. A comprehensive

plan of organized cartage and delivery service would tend to increase the load per truck so that the congestion due to light-loaded trucks might be materially reduced.

The benefits of an organized cartage service are well illustrated in England and Canada and in the cities of the United States where a beginning has been made in this direction. London, the largest city of the world, through the use of a highly efficient cartage service, handles a tremendous volume of merchandise traffic with only 33 railway goods stations. With the assistance of an organized pick-up and delivery service Montreal handles its city merchandise traffic through 5 principal freight stations.

The rapid development of the terminal problem makes it necessary that immediate steps be taken to relieve the situation. The efficiency of the American transportation system is in danger of serious impairment. The motor vehicle when efficiently used has been proven, by the acid test of actual service, to be an efficient terminal carrier of freight. It is available for use as a helpful instrument of transportation to facilitate the terminal handling of cargo, but it may be so employed as to break down the transportation system by congestion of the terminal areas.

The chapters following deal with some of the efforts that have been made, and with some plans under consideration, by carriers and shippers to solve the problem of moving a greater volume of traffic at lower unit costs through the terminal—the eye of the transportation needle.

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CHAPTER III

THE MOTOR FREIGHT VEHICLE IN TERMINAL SERVICE

In 1895 the first motor cars made their modest entry into the field of transportation in the United States, four automotive vehicles having been registered in that year. All automotive vehicles produced and registered in this country up to 1904 were listed as passenger vehicles, or as passenger and commercial vehicles other than the types we know as trucks to-day. In 1904, a little over twenty-one thousand passenger cars and about four hundred trucks were manufactured, while 54,590 passenger vehicles and 410 motor trucks were registered. Since that year the production figures for passenger vehicles and trucks have risen spectacularly year by year.

Figures for January 1, 1929, indicate an increase of a little more than four and a half million in the total registration of automotive vehicles compared with January 1, 1928, and an increase of a little less than one hundred thousand in the registration of motor freight trucks and road tractors. The rate of growth of truck, truck-and-trailer, tractor-and-trailer and semi-trailer transportation has been more rapid than the rate of increase of all classes of automotive vehicles. Table V on page 26 states the annual production and registration of motor passenger cars and freight trucks.

The production figures for passenger vehicles and trucks are those compiled by the National Automobile Chamber of Commerce and include not only the vehicles of these types manufactured in the United States but vehicles produced in plants in Canada which make automobile vehicles of United States design.

The Use of Motor Freight Vehicles by Railroads

It is impossible to estimate accurately the number of motor trucks, tractors, trailers and semi-trailers used in freight service by steam railroads, electric railroads and steamship carriers. The number is large, but any statement of the number of motor freight vehicles used by these carriers omits all vehicles that are used in coördinated service, for many motor vehicles are operated by independent motor transportation companies and individuals in conjunction with railroad, electric railway and steamship freight services. It is inaccurate to assume that all independent motor transportation service is competitive, for independent services often supplement, extend and improve the services of other carriers, especially in terminal cartage.

Reference has been made to the inquiry of the Interstate Commerce Commission conducted into the use of motor freight and passenger vehicles by common carriers subject to the Interstate Commerce Act. Every common carrier subject to the Act was made a party to the proceedings and required to furnish data regarding the use and competition of motor vehicles. The data in Tables VI and VII are taken from the statistical summaries for Classes I, II and III rail carriers compiled by the Commission. The decision of the Commission, based upon a nation-wide investigation, was handed down April 10, 1928. A tentative report by Attorney Examiner Flynn was made prior to this decision.[1]

The figures for Class I railroads shown in Table VI represent those that are really significant for nearly all of the railroads of national importance, Class II and Class III railroads are almost all short lines having less than 100 miles of line in operation. See Table VII.

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[1] Statistical Summaries, Interstate Commerce Commission, Class I and Class II and Class III Carriers, Washington, 1927, I.C.C. Docket No. 18300.

TABLE V

ANNUAL SUMMARY OF MOTOR PASSENGER CAR AND TRUCK DEVELOPMENT, 1895-1928

	Passenger Vehicles		Freight Vehicles	
Year	Production	Registration	Production	Registration
1895	4	4	....	....
1900	5,000	8,000	....	....
1904	22,419	54,590	411	410
1905	24,550	77,400	450	600
1910	181,000	458,500	6,000	10,000
1915	895,930	2,309,666	74,000	136,000
1920	1,905,560	8,225,859	321,789	1,006,082
1925	3,896,032	17,512,637	531,628	2,441,709
1926	3,975,640	19,237,171	527,891	2,764,222
1927	3,086,018	20,230,429	487,653	2,896,886
1928	4,044,000	24,493,124	586,000	3,092,000

TABLE VI

MOTOR FREIGHT SERVICE: AUTOMOTIVE VEHICLES USED IN COMPETITIVE AND CONNECTIVE SERVICES, CLASS I CARRIERS

Class I Carriers: Operating Revenues Over $1,000,000 per Annum

Region	Motor Vehicles Used in Connection with Railroad Service	Motor Vehicles Used in Competition with Railroad Service
New England	1	3,392
Great Lakes	97	7,220
Central Eastern	58	12,614
Pocohontas	67	260
Southern	None reported	2,250
Northwestern	None reported	3,981
Central Western	2	10,380
Southwestern	...	3,110

TABLE VII

MOTOR FREIGHT SERVICE: AUTOMOTIVE VEHICLES USED IN COMPETITIVE AND CONNECTIVE SERVICES, CLASS II AND CLASS III CARRIERS

Class II Carriers: Operating Revenues $100,000 to $1,000,000 per Annum; Class III Carriers: Operating Revenues Less than $100,000 per Annum

Region	Motor Vehicles Used in Connection with Railroad Service	Motor Vehicles Used in Competition with Railroad Service
New England	1	32
Great Lakes	3	54
Central Eastern	None reported	203
Pocohontas	None reported	None reported
Southern	1	32
Northwestern	2	23
Central Western	33	60
Southwestern	..	101

The Sphere of the Motor Truck in Freight Service

The motor truck is being used extensively in congested districts to relieve terminal congestion. It is a curious paradox that the motor vehicle which has tended to increase the congestion in terminal districts should be the instrumentality that is turned to for relieving the situation. The relatively small capital investment per unit of equipment, the lower operating expenses of motor freight vehicles compared with rail freight transportation costs, and the flexibility of the motor, when it is properly used as a freight carrying unit in terminals, makes the truck an ideal terminal freight facility for rapid and economical movements of goods in small quantities for short distances.

Motor trucks are being used in a number of American cities as retail distributing facilities to collect, deliver and interchange freight in the terminal districts. Freight is brought into the terminal districts by railroads or steam-

ships and distributed in smaller quantities by motor, and outbound freight is concentrated by the use of motor vehicles in the terminals and turned over to the railroad or steamship carriers for line movement. Coördinated railroad and motor line-haul and terminal transportation services have improved transportation where installations have been made. The problem of applying specific plans of coördinated service is being studied to relieve congestion in other terminals.

Motor freight vehicles are used in these terminal services:

1. As substitutes for railroad trap or ferry cars to convey less-than-carload freight between railroad freight depots or transfer stations and private industrial sidings where the volume of freight is too small to justify the use of freight cars.
2. As substitutes for railroad freight cars in such intra-terminal movements as are usually slow and inefficient when performed by railroad freight cars.
3. As substitutes for railroad equipment in the interchange of less-than-carload freight shipments between railroads in the terminal districts.
4. In place of railroad freight cars in substation delivery and collection services between major freight depots and stations in outlying commercial and industrial districts of terminal areas.
5. In lieu of lighters, barges or car floats at ports where such services are performed between freight stations of the various railroads, steamship piers and industrial plants in the harbor.
6. In the interchange of joint through traffic between rail and water carriers.
7. As collection and delivery vehicles connecting railroad stations and steamship piers with the warehouses and stores of shippers and consignees.
8. To replace local or way freight trains in handling less-than-carload traffic between the metropolitan centers and the stations on the divisions of the railroads serving surrounding suburban districts.
9. As units of organized cartage services such as those operated in the larger cities of England and Eastern Canada.[2]

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[2] G. Lloyd Wilson, *Proceedings*, Society of Automotive Engineers, January, 1927.

Present Terminal Use of Motor Vehicles

The motor, as it is operated at the present time in the majority of American terminals, is not as efficient a carrier of goods as it would be under a more orderly operating arrangement. Trucks loaded to but a fraction of their carrying capacities are operated between railroad freight stations, steamship piers and the factories, warehouses and stores of shippers and consignees in the terminal districts. The unorganized cartage operations result in light average truck loading, cross routing, empty truck mileage, delay, street congestion and similar evidences of inefficiency.

The unorganized and disconnected condition of rail terminal and motor cartage service results in the holding of less-than-carload freight shipments in the warehouses of freight stations in the United States an average of three days. In the cities of England and Canada, where coordinated rail and cartage arrangements are in effect, freight depots are cleared entirely twice daily. In these countries small consignments of freight are delivered by the rail carrier directly to teams or trucks to be hauled to the store doors of the consignees without waiting. The carrier does not wait for them to send their own or hired teams to the freight stations. Notices announcing the arrival of the goods are dispensed with entirely. This reduces clerical expense and saves time.

Outbound shipments, in the same way, are hauled by teams or trucks of the railways or the large consolidated cartage companies to the freight depots, where the freight is loaded directly into the cars without the delays incident to handling the goods through the railroad freight houses.

Collect and delivery services are popular in England and Canada where a large majority of shippers and consignees avail themselves of the combined railroad and cartage services. Prompt service and reasonable cartage rates are

the result of the efficient organization and widespread use of the services by shippers and consignees.

Two general classes of freight are moved by the railroads and other line carriers of the United States—carload and less-than-carload traffic. The two differ in several particulars: carload freight is loaded into and unloaded from freight cars by the shippers or consignees or the trucker whom they employ, while less-than-carload freight is loaded and unloaded by railroad employees without extra charge to the shippers or consignees. Carload freight, as a rule, does not pass through freight stations but is loaded and unloaded at the expense of the shippers or consignees on public team tracks or private tracks of industries. Less-than-carload freight is loaded and unloaded over station platforms at the expense of the carriers. In most instances the freight stations are located on high priced property in the congested areas of large cities. Less-than-carload freight rates are higher than carload rates. Cars carrying less-than-carload freight are seldom, if ever, loaded to anything like their tonnage capacities. The heavy station expense incident to handling less-than-carload freight is reflected to some extent in the higher charges per hundredweight.

The report of the special committee of the Chamber of Commerce of the United States found that delays in terminal service were attributable, in part, to the prevailing practice of notifying consignees of the arrival of shipments of less-than-carload freight after the goods have been unloaded in the railroad freight houses, or after the cars containing carload freight have been placed on the team or industry tracks. The railroads give consignees an allowance of forty-eight hours' free time for the loading and unloading of carload freight and the same allowance of time for the removal of less-than-carload freight from the freight stations. Partly because of unorganized cartage

methods and inadequate storage facilities and partly for the reason that many goods are sold after arrival at the terminal, a large proportion of the consignees take full advantage of the free time allowance. In consequence, carload shipments on the average remain on the team tracks in excess of two days and inbound less-than-carload shipments remain in the railroad freight houses an average of three days.

Failure to load and unload cars promptly at industries and team tracks is another cause of terminal delay and congestion of freight terminals. These failures tie up a large amount of the railroad equipment that could otherwise be moving freight. Failure to remove less-than-carload freight from the freight houses often results in such congestion that the equipment is held up and moreover causes a piling up of goods in the freight houses, with great resultant delay and confusion in locating and removing shipments, and a general slowing down of the entire freight-house operation. The unfortunate tendency of shippers to deliver their outbound goods upon the freight house at the last moment produces the same effect. This in turn increases cartage and costs of delaying the vehicles used by shippers and consignees.[3]

The committee found another practice involving wasteful use of cars and contributing to congestion to be the loading of small quantities of freight into "trap" or "ferry" cars by industries with sidings. Such cars, generally loaded to only a small part of their capacity, must be switched from the sidings of the shippers to transfer platforms or freight stations located in the break-up yards of the rail carriers or elsewhere. Here the freight is rehandled by employees of the railroads and consolidated into cars for the line-haul movement. The railroads themselves also make a similar use of cars for interchanging less-than-carload freight with each other, and in some cities for movement between local

[3] Report, Chamber of Commerce of the United States, Committee No. 3, p. 11.

freight houses and general assembly and distribution stations.

The general demand for more and better rail transportation is insistent, and the railroads are confronted by a serious dilemma. They must either add to their present terminal facilities or find a way to move more freight into, out of and through the existing terminal facilities. Enlargement or multiplication of terminal stations and team tracks in important terminal areas is practically impossible because of prohibitive cost, objection of municipalities to the expansion of railroad holdings in congested areas, and furthermore the additional traffic congestion that would result from greater centralization of freight vehicular traffic in the terminal areas.[4]

How the Motor Truck Can Best Relieve the Situation

There are two alternative methods by which the railroads can correct the present terminal congestion, either by adding to their present terminal facilities, which is often prohibitively expensive, because any enlargement or multiplication of the number of stations within terminal areas is attended with extreme costs, or by finding a way to pass more freight through the existing terminals.

The utilization of the motor truck in the terminal areas can assist in accomplishing this result in several ways:

1. Through the substitution of motor service for part of the services within the terminal area now performed by railroad equipment. This includes among other things the substitution of motor trucks for the railroad "trap car" and "ferry car," as well as the use of trucks for the interchange of less-than-carload freight between different rail carriers in the terminal areas and between local stations of the same carrier.
2. Through the complete elimination of certain uneconomical rail services. This includes the handling by truck of all freight, carload as well as less-than-carload, between industries within the terminal area and between various plants of the same in-

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[4] *Ibid.*, p. 12.

dustry; the motor handling of intraterminal shipments of all kinds; and the transfer of traffic between the terminal area and its tributary districts by trucks instead of cars. The result of this substitution would be the elimination of many of the intraterminal switching services now performed by the rail carriers, the services being performed more economically by motor than by railroad cars.

3. Through the establishment of an organized cartage service in place of the present haphazard methods of receipt and delivery at the rail terminals.

4. Through the establishment of comprehensive plans of store-door delivery by which the transportation service is made complete.

The plans of coördinating rail, electric railway and steamship with motor freight and passenger services in terminal and at way freight stations are discussed in later chapters. Fifty-nine railroads, a number of electric railways, and several steamship lines are using automotive freight services in one or several of these ways at the present time. Sixty-seven steam railroads and 365 electric railways operate more than eleven thousand busses in coordinated passenger transportation services.

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CHAPTER IV

THE ST. LOUIS PLAN OF TERMINAL TRANSPORTATION COÖRDINATION

Motor trucks are used to advantage to improve terminal freight services where physical obstacles have prevented the construction and connection of adequate railroad facilities. No better illustration of this phase of coördination can be found than the service operated by the Columbia Terminals Company in connection with the railroad lines serving St. Louis, Missouri, and East St. Louis, Illinois.

St. Louis has a population of more than three quarters of a million; 772,897 as shown in the United States Census of 1920. East St. Louis, across the Mississippi River, in Illinois, has a population of 66,767. The population of this combined metropolitan terminal area was estimated at 952,012 in 1920 and reached approximately 1,000,000 in 1928. The metropolitan district embraces an area of nearly 200,000 acres. In population, St. Louis proper ranks as the sixth largest city in the United States and the metropolitan district is the eighth largest. St. Louis is the center of a great inland distribution territory which serves the Middle West and Southwest. It is sometimes referred to as the "forty-ninth state."

Physical Characteristics of the Terminal District

St. Louis is separated from East St. Louis by the Mississippi River, which was not bridged at this point until 1876, when the Eads Bridge closed the gap between the two cities. Prior to this the railroads approaching the St. Louis district from the east established terminals in East

St. Louis, while the roads entering from the west built their freight yards, stations and other facilities in the industrial and commercial districts of St. Louis proper. Continuous railroad freight service from St. Louis and from points west of the river to points on eastern roads was impossible, as was through service from East St. Louis and points on the lines of the eastern carriers to St. Louis and points west of that point.

When the Eads Bridge was built with double decks, one for railroad tracks and the other for vehicular traffic, efforts were made by several eastern lines to establish freight and other station facilities in St. Louis proper. These roads were faced with the choice of investing millions of dollars in establishing their own facilities for receiving and delivering carload and less-than-carload freight in St. Louis or of arranging to have the freight received and delivered in this district by some other individual or joint agency. During the years before the building of the Eads Bridge made it possible for the eastern railroads to cross the river and receive freight and make deliveries from stations and facilities on their own rails, the western roads had been busy acquiring the choice sites for freight terminals and stations in the heart of the commercial and industrial sections of St. Louis. Only one eastern and one southern carrier attempted to establish facilities in St. Louis. The station of the eastern railroad was abandoned because the expense of maintaining the depot was heavy and the location unfavorable. The southern railroad still maintains its on-track station in St. Louis, although a large percentage of the freight traffic moving into and out of St. Louis over its line is handled through off-track stations of the motor haulage company.

Before the opening of the Eads Bridge freight from St. Louis to points east of the Mississippi, that to St. Louis from east of the river, and that to be interchanged between

the eastern and western carriers at St. Louis was ferried across the river. After the construction of the bridge there was a period of keen competition between the bridge company and the Wiggins Ferry Company, which operated a ferry service. The ferry company was absorbed by the bridge company in 1902, and, thereafter, carload freight was interchanged between the roads via the bridge. Less-than-carload freight to be forwarded, delivered or interchanged was handled across the river for the most part by teams or drays which used either the bridge or the ferries.

The unusual amount of freight to be drayed between shippers and consignees in St. Louis and the railroad terminals in East St. Louis, in addition to the local freight to be hauled in St. Louis caused the cartage or transfer business to increase rapidly. A number of local transfer companies were active in the service.

The St. Louis Transfer Company established stations in St. Louis at which freight for or from the railroads in East St. Louis was carried from or to St. Louis proper. In 1902, the Columbia Transfer Company was organized and engaged in the same service. Each of these large companies and lesser teamsters and draymen competed for the haulage between the railroad stations and shippers and consignees on opposite sides of the river, and for doing interrailway and local cartage in St. Louis. Off-track freight stations in St. Louis were established only by the St. Louis Transfer Company and the Columbia Transfer Company.

The rates of the eastern rail lines for many years applied to and from their East St. Louis terminals, with higher charges for traffic originating at or destined to St. Louis proper. A commission, appointed by the municipal authorities of St. Louis, and representing the business interests and railroads entering the terminal district, negotiated a rate agreement with the eastern railroads to apply the East St. Louis rates to St. Louis proper. This change was

effected in 1910, and gave the merchants of St. Louis carload rates and services applying to all delivery points in the St. Louis terminal district and less-than-carload rates to all freight stations in the terminal area.

The rail lines ending at East St. Louis arranged with a jointly owned terminal railroad, The Terminal Railway Association, to make deliveries and originate carload shipments at St. Louis. Contracts were made with the transfer companies to handle inbound and outbound shipments of less-than-carload freight at St. Louis as the agents of the eastern railroads, the less-than-carload shipments being handled between the railroad freight stations in East St. Louis and the stations of the transfer companies, or in some cases the warehouses of the shippers and consignees, in St. Louis.

The St. Louis Transfer Company and the Columbia Transfer Company controlled a large part of the local terminal trucking service on each side of the river and also the transfer business between East St. Louis and St. Louis for shippers, consignees and the railroad companies. In April, 1928, the Columbia Transfer Company acquired all of the capital stock and the facilities of the two companies were merged into a new company, operating under the name of the Columbia Terminals Company. This organization has functioned continuously since that time and it is one of the largest local freight handling companies in the United States.

The transfer companies, prior to 1919, used horses and drays, 700 horses and 300 horse-drawn vehicles being required. Auto-trucks did not immediately displace the horse-drawn vehicles. Motor trucks when first installed experimentally increased the costs as compared with horse-drawn vehicles. Loss of time of trucks in waiting at the depots for the freight to be loaded or unloaded offset the efficiency of the faster movement between the depots. In

1919, experiments were made with tractor and semi-trailer equipment, and this proving successful in reducing the cost of operation the company commenced the replacement of horse-drawn vehicles with tractors and semi-trailers, which, since 1924, have been used exclusively. The company in 1928 had a fleet of 107 tractors, 420 semi-trailers with a capacity of nine tons each, and 75 motor trucks. The trucks are used in contract service with business houses.

The Columbia Terminals Company is engaged in three forms of terminal cartage service: in the transportation of less-than-carload freight between St. Louis and the railroad freight stations in East St. Louis; in the interchange of less-than-carload freight between the eastern and western railroads; and in store-door service or local cartage within the St. Louis terminal district. The first two services are performed by the cartage company as the agent of the railroad companies, while the third is rendered by the cartage company on arrangement with the shippers and consignees in the terminal area.

The company operates six outbound and four inbound "off-track" freight depots in St. Louis, where outgoing and incoming merchandise freight is handled from shippers or for consignees. Stations of the company are also maintained at thirteen railroad terminals in East St. Louis and at several railroad freight stations in St. Louis proper. There is also a storage department in St. Louis where goods are stored awaiting orders of the owners.

The Operating Department

The Columbia Terminals Company operates three geographical groups of terminals. The south-end group includes the outbound "off-track" stations of the company at Broadway and Spruce Street, Broadway and Chouteau Street, Eleventh and Spruce streets, Second and LaSalle streets, and Seventh and Cerre streets; the inbound

depots at Fourth and Valentine streets, Sixth and Spruce streets, and at Seventh and Gratiot streets; the storage depot, and the railroad freight depots of the Missouri Pacific, Frisco Lines and Iron Mountain railroads. The north-end group includes the outbound depot of the Columbia Terminals Company at Second and Carr streets; the inbound depot at Broadway and Carr streets; and the freight stations of the Chicago, Burlington and Quincy, the Chicago, Rock Island and Pacific, the Missouri-Kansas-Texas, the Cotton Belt and the Wabash railroads, the docks of the Mississippi River Barge Line, and the freight station of the Illinois Traction Company's electric railway. The third or the east-end group includes the thirteen freight terminals of the railroad lines in East St. Louis.

A fourth operating division includes the fleet of motor vehicles used in the service of hauling the freight between these depots. The supervision of this fleet is the task of the dispatching division of the operating department.

The dispatching division of the company comprises three district dispatchers, one at a station in each of the three operating territories. The chief dispatcher is located at the Broadway and Spruce Street outbound depot in the south-end territory; another dispatcher is at the Second and Carr streets outbound depot in the north-end territory; and a third dispatcher is located in East St. Louis in the east-end territory.

The district operating superintendents in the three districts report to the chief dispatcher the number of loads of freight on hand to be moved late in each day so that arrangements may be made to distribute equipment to each operating division. The district dispatchers also exchange reports of conditions and furnish information of all sorts pertaining to operation in order to prepare each evening for the next day's work.

Trailers and men are assigned to each operating district

FIG. 1.—THE ELEVENTH STREET OUTBOUND DEPOT OF THE COLUMBIA TERMINALS COMPANY, ST. LOUIS, MISSOURI

FIG. 2.—TRUCKS OF THE COLUMBIA TERMINALS COMPANY AT THE PENNSYLVANIA RAILROAD DEPOT IN EAST ST. LOUIS, ILLINOIS

FIG. 3. SHIPPERS DELIVERING OUTBOUND FREIGHT AT THE ELEVENTH STREET DEPOT OF THE COLUMBIA TERMINALS COMPANY, ST. LOUIS

and to each "off-track" depot and freight station in each district according to quotas determined by the peak traffic at each depot or station. A foreman of the operating department controls the work of the loading clerks and of the freight handlers at each station. The forces at the railroad stations report to the district superintendents of the operating department. The operators and helpers assigned to the vehicles are controlled by the dispatching staff.

Vehicles are moved according to the order in which loading is completed and are ordered by the dispatching office to proceed to destinations. After the vehicle is unloaded at destination, the chauffeur in charge telephones to the dispatcher in charge of the district to which the load has been delivered, reporting the number of the vehicle, and the place from which the report is being made. The dispatcher then assigns the chauffeur to the nearest station for duty and reports to the chief dispatcher the disposition of the vehicle and chauffeur and the time consumed by the vehicle in performing its work.

Hourly reports are made by the staff at each outbound station to the chief dispatcher of the number of loads moved, the number of vehicles being loaded, the number actually loaded and ready for movement, the estimated number of loads on the station platform, and the number of empty trailers at each depot available for loading.

The transfer man in charge of each railroad freight station in East St. Louis reports to the district dispatcher in the East St. Louis office the number of cars of merchandise freight on hand at each station to be handled. He also reports the number and destination of each trailer load of freight as it leaves the station platform. These reports are relayed by the district dispatcher to the chief dispatcher, thus enabling estimates to be made of the volume of freight to be moved so that vehicles and chauffeurs,

as they are released at destination, may be assigned to handle the traffic.

A record of each transfer is kept by a card control system in the office of the chief dispatcher. Tractors garaged in the St. Louis districts are identified by white cards, while those working out of the East St. Louis garage are recorded on blue cards. Every move made by a tractor and the time of the move is reported to the local dispatcher and relayed to the chief dispatcher's office where an entry is made upon the card which represents the tractor. The fleet is controlled through these card records which show the logs of each tractor from the time it is released from the garage in the morning until it returns and the crew is released at night. The number of tractors in each operating district and the work they are performing can be ascertained at any time of the day by counting the cards and noting the entries upon the cards.

The chief dispatcher is able, by consulting the movement records, to allocate tractors or vehicles to any inbound or outbound depot or railroad freight station, in order to meet emergencies and to prevent congestion. If sufficient tractors or vehicles are not available to handle the volume of freight at any one station, requests made of the chief dispatcher result in assigning the necessary equipment at once from the nearest stations or depots where extra tractors or trailers are available. Empty mileage is thus reduced to a minimum and idle time of men and equipment is avoided. If, for example, there is not sufficient traffic at the outbound stations for movement to East St. Louis to balance the flow of tonnage from East St. Louis to the inbound stations in St. Louis proper, the chauffeurs, when they report the disposition of their loaded vehicles at destinations on the west side of the Mississippi River, are ordered to proceed immediately to the East St. Louis stations without load, instead of proceeding to the nearest

outbound station in St. Louis, as is customary. Tractors ordered to cross the river without loads are picturesquely termed "over lights." These tractors report to the dispatcher at the district for assignment upon arrival at East St. Louis.

Definite fixed schedules are made for operation and are adhered to under normal circumstances. Chauffeurs are held strictly accountable for meeting schedules. Special modifications of the schedules are made by the chief dispatcher to take care of emergencies or when freight is over, short or damaged. When tractors and trailers, reported as leaving one district for another, fail to arrive at their appointed destinations in due course, the chief dispatcher gets in touch with the district dispatchers or the superintendents and ascertains the causes of delay, and makes the arrangements necessary to remedy the situations causing the trouble.

One of the unique features of the Columbia Terminals Company's dispatching plan is the practice of ascertaining from shippers the probable volume of business to be expected the next day. At four o'clock each afternoon the foreman at each outbound depot calls up the principal users of the service to ascertain the amount of freight each expects to ship the following day. In like manner, each district superintendent makes an estimate from first-hand information of the amount of railroad tonnage to be handled the next day.

Reports are made by the depot foremen and district superintendents to the chief dispatcher at four-thirty each afternoon. These reports show the number of loads moved and loaded that day, the condition of each station, the number of loads of freight ready for delivery upon the opening of business the next day, and an estimate of the amount of traffic to be moved the next day. Summaries of these reports are made by the chief dispatcher to the

operating officials so that personnel and equipment may be allocated where they are needed.

Mr. James Mooney, Chief Dispatcher of the Columbia Terminals Company, states that "to eliminate waste and produce the best results from each unit, the company has developed a dispatching system unsurpassed in this particular field. By reason of it, the management is able to follow accurately the activities at each station and ascertain the exact status of each motor unit at any moment of the day. Well-devised record forms and our system of communication simplify the duties of the dispatchers in watching and recording all details of the day's operations."[1]

The Terminal Company and the Railroads

The Columbia Terminals Company has contracts with twenty-three railroads for handling traffic in the St. Louis terminal district, including eighteen large steam railroads, several smaller steam rail lines and several electric railways. The list includes:

Baltimore and Ohio Railroad
Chicago, Burlington and Quincy Railroad
Chicago and Alton Railroad
Chicago and Eastern Illinois Railway
Chicago, Peoria and St. Louis Railroad
Chicago, Rock Island and Pacific Railway
Cleveland, Cincinnati, Chicago and St. Louis Railway (the "Big Four")
Frisco Lines
Illinois Central Railroad
Louisville and Nashville Railroad
Missouri-Kansas-Texas Lines
Missouri Pacific Railroad
Mobile and Ohio Railroad
New York, Chicago and St. Louis Railroad
Pennsylvania System

[1] "Why Columbia Service Moves Like Clockwork," paper before Progressive Club, Columbia Terminals Company, November, 1927.

St. Louis-Southwestern Railway
Southern Railway
Wabash Railway
Louisville, Henderson and St. Louis Railway
East St. Louis, Columbia and Waterloo Railway
Litchfield and Madison Railway
St. Louis, Troy and Eastern Railroad
Illinois Traction System, an electric railway, now the Illinois Terminal Railroad System.

The terminal company performs all the functions of receiving, delivering and billing the inbound and outbound shipments in the name and as the agent of the respective railroads that are to move the freight or to have hauled it. The inbound and outbound off-track stations are the extensions or outposts of the eastern railroads and electric lines in connection with shipments moving by rail out of or into St. Louis via these carriers. All charges incident to the services of receiving, delivering, billing and hauling are absorbed by the railroads out of the through rates applicable to and from St. Louis.

The terminal company performs the hauling services incident to the interchange of less-than-carload freight between the eastern and western railroads in the capacity of agent of these lines as a part of the through transportation services offered by these carriers at through rates. No additional charges are assessed against the shippers or consignees of the goods.

The store-door service performed by the Columbia Terminals Company is not included in the through railroad rates. Additional charges for this service are agreed upon by the terminal company and individual consignees.

Officials of the Columbia Terminals Company state that the company handles nearly 7,000,000 pounds of freight daily, 466 carloads of 15,000 pounds each or nearly 150,000 carloads yearly. About 65 per cent of this consists of traffic originating at or destined to St. Louis, while 35 per

cent is traffic interchanged between roads terminating in St. Louis and East St. Louis. About 5 per cent of the traffic is delivered in store-door service to consignees directly by the Terminals Company.

A large proportion, about 75 per cent in 1928, of the interchange freight is delivered to the connecting lines the same day it is unloaded at the platforms of the roads which bring the freight to the terminal. This record is remarkable when compared with interchange records at terminals where less-than-carload traffic is interchanged by all-rail service, two to three days for all-rail interchange being not unusual.

Mr. J. F. Murphy, Vice-President of the Columbia Terminals Company, states that the interchange service is handled by automotive terminal transportation service more expeditiously and at a lower cost to the railroads, all factors considered, than it could be handled through the terminals by all-rail service. The expense of drayage to shippers and receivers of freight dispatched from or destined to St. Louis is reduced materially by the convenient location of the universal off-track stations provided by the Columbia Terminals Company.

The same officer states that the damage record for three years from all causes, including that sustained in handling at the stations of the terminal company as well as damage in transit on the company's vehicles amounted to 0.0027 per cent of the revenue earned on outbound shipments and 0.0031 per cent on inbound. Loss and damage claims amounted to .0033 per cent of the revenue earned for the period January, 1927, to June, 1928, inclusive, a truly remarkable record.

The record of this company and its plan of operation is a fertile source of study to those seeking material that will assist in improving the conditions in other terminal districts where similar conditions obtain.

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CHAPTER V

TERMINAL MOTOR COÖRDINATION IN THE CINCINNATI TERMINAL

The terminal problem at Cincinnati, Ohio, although differing in physical aspects has many points of similarity with that at St. Louis. In Cincinnati trucks are used to move less-than-carload freight between the principal freight stations and the substations of the same rail lines and to interchange less-than-carload traffic between stations of different rail carriers serving the terminal. There is no great barrier such as the Mississippi River at St. Louis, although the terminal at Cincinnati is complicated to some extent by the Ohio River. The situation became acute because of the development of new industrial and commercial sections of the heights back of the city, away from the older river-front district which for many years was the center of industrial and commercial activity.

The rail carriers entering Cincinnati located their first freight stations in the river-front district so as to establish themselves as nearly as possible in the center of the area they sought to serve. As new industrial districts grew to be important, the railroads established branch freight depots in those sections for the greater convenience of shippers and receivers of freight, and to increase the competitive value of their facilities.

Less-than-carload freight was delivered to these branch stations by the use of "ferry" cars from the main freight stations of the road in the down-town district. Outbound shipments from the branch depots were "ferried" to the main stations or from other branch depots for movement to outside destinations. If a sufficient volume of less-than-

carload freight was available for movement to or from a branch station on a particular day, solid "classification" or "destination" cars were loaded directly to or from these stations. Such movements, however, were exceptional rather than the rule.

In addition to the movement of less-than-carload shipments between in-city and outlying freight stations, a considerable volume of such traffic had to be interchanged between connecting roads in the terminal. These two terminal movements increased in volume until the movements of traffic by "trap," "ferry," or "transfer" cars by the railroads overtaxed the facilities of the stations and the terminal tracks. Loading and unloading platform facilities and team tracks had to be improved and their capacities increased. A board of engineers, appointed by the United States Railroad Administration to investigate the situation, estimated that the proposed improvements would involve an expenditure of more than $12,000,000. It would have been necessary to purchase additional land and buildings in the central sections of the city as well as to construct additional trackage. The use of "trap" or "transfer" car system required more terminal running tracks, more storage tracks and greater freight station platform capacity.

Seven important steam railroads serve Cincinnati—the Baltimore and Ohio, the Cleveland, Cincinnati, Chicago and St. Louis (the Big Four), the Chesapeake and Ohio, the Louisville and Nashville, the Norfolk and Western, the Pennsylvania and the Southern Railway. These carriers maintain 28 major and minor freight stations. The average distance between the main freight stations and the substations and other stations is about 2½ miles, while the maximum distance is nearly 10 miles. Freight must be hauled an average distance of approximately 2 miles between major freight stations and about 3½ miles between

the principal freight depots and subfreight stations in this district. An average of 225 railroad cars daily were used in the ferry car and transfer car service and more than a hundred heavy horse-drawn drays were used to supplement the service of the railroad cars. Recurring periods of terminal congestion reduced the efficiency of the line-haul freight service.

The Cincinnati Motor Terminals Company's Service

In May, 1917, the Cincinnati Motor Terminals Company undertook a contract for the handling of the less-than-carload freight by automotive equipment between the five stations of the Big Four Railroad. On May 10, 1919, the system was extended to embrace the main and substations of all railroads entering Cincinnati. The company is a separate operating corporation, and it performs the transfer service under separate contracts with each rail line, compensation for the service being based upon the volume of tonnage handled. The rates range between $0.50 and $2.25 per ton, depending on the length of haul between stations, the average revenue per ton being $1.13. A minimum charge equal to that for two tons is made for each load.

The freight is placed into and unloaded from demountable containers by railroad employees. The Motor Company transports the demountable bodies delivered loaded and sealed to them by the railroads. Truck chassis of five tons' capacity each are used. The containers are of weatherproof steel and wood construction and measure 17 feet 5 inches in length, 8 feet in width and 6 feet in height. Fixed hoistways for the mechanical handling of the container to and from the motor chassis were installed by the rail carriers at each railroad station. The containers, hoists and motor vehicles are provided by the trucking company and operated and maintained at its expense.

FORM 201

Cincinnati Associated Railroads

.....RAILROAD

Sheet No.....

Cincinnati, Ohio,.....19.....

ABSTRACT AND SETTLEMENT RECORD OF L. C. L.
FREIGHT HANDLED BY CINCINNATI MOTOR TERMINAL CO.

From To Body No.

Date	Waybill No.	Waybill Made by	Point of Origin	Destination	Pro	Weight

Time Ready Time Out Driver Truck No.

Seats {Ends:..... Forwarding Clerk.....
Sides.....

Receiving Clerk..... Time.....

Receipt on this sheet is for body and bills only; and not for individual shipments.

FIG. 4. ABSTRACT OF WAYBILLS FORM USED IN CINCINNATI

The railroad notifies the truck dispatcher of the Motor Company when a container is loaded and ready for movement. It is then sealed and a triplicate abstract of the waybills covering the freight to be transferred is prepared by railroad station employees. One copy of the abstract is retained by the forwarding road; a second, with the waybills for the shipment, is given the truck driver for the receiving road; and the original is given to the driver of the truck to be delivered to the Motor Company. Figure 4 is a copy of the form of the abstract of waybills used by all railroads having the service.

The average time consumed in transferring the bodies to and from the chassis is said to be 5 minutes; the average load per container is 4.37 tons and on a normal 10-hour day a chassis makes 26 trips between stations. The average daily movement of freight by truck is about 800 tons, the estimated capacity of the facilities being 1,200 tons per day. About 30 per cent of all less-than-carload freight passing through the Cincinnati freight stations is handled by the trucking company. Of this tonnage, about 75 per cent is freight interchanged by the railroads, and the remainder is that moving between stations and end-stations of the same road. Figure 5 is a specimen of the dispatcher's record.

The Advantages of the Service

The use of motor trucks as a supplement to existing railroad facilities at Cincinnati has accomplished its main purposes, which were the quicker interchange of package freight between the rail lines and the prompter movement of less-than-carload freight between the different stations of the same lines. These results have been obtained at a relatively small expenditure of capital. More efficient service is now provided than was secured from all-rail equipment. The greatest advantages have been the main-

The Cincinnati Motor Terminals Co.

TRUCK No._____ **DISPATCHER'S RECORD** **DATE**_____

	FROM	TO	DEPARTURE	ARRIVAL	DISTANCE			DELAY AND CAUSE
					Lead	Empty Body	Chassis	
KEY								
2 Sou.-Vine St.								
3 Sou.-Lin. Pk.								
4 N. & W.								
5 B4-Central Ave.								
6 B4-Front St.								
7 B4-Warehouse								
8 B4-Brighton								
9 B4-Ivorydale								
10 P. H.-East End								
12 P. H.-West End								
13 C.&O.-Fourth St.								
14 C.&O.-Third St.								
15 C.&O.-Cheviot								
16 L.&N.-Newport								
17 L.&N.-East End								
18 L.&N.-Covington								
19 C.&O.-Covington								
20 L.&N.-West End								
22 B.&O.-Smith St.								
24 B.&O.-KenyonAv.								
25 B.&O.-Gest St.								
26 B.&O.-Brighton								
27 B.&O.-Norwood								
28 B.&O.-Oakley								
29 Garage								
30 Sou.-Brighton								

Chauffeur_____ Dispatcher_____

FIG. 5. DISPATCHER'S RECORD FORM OF THE CINCINNATI MOTOR TERMINALS COMPANY

tenance of interchange and substation service without increasing railroad equipment and the elimination of the congestion that formerly prevailed. The plan would be considered highly successful by the railroads and shippers for these benefits alone, without the other advantages that have followed from the use of motors.

The use of motor vehicles and container bodies decreased the time required to perform less-than-carload interchange service. The average interchange operation took 62 hours by railroad freight car and 72 hours by horse-drawn dray. This has been reduced to a maximum of 10 hours. Virtually all inbound less-than-carload shipments are received at the delivering station on the same day they arrive at the main terminal station. Outbound shipments are usually delivered to the main freight stations of the roads which are to forward them from Cincinnati on the day they are received at the initial freight station. The saving in time is an advantage that greatly benefits both the railroads and the shippers.

Less platform space is required to handle inbound and outbound shipments. Instead of the usual interrupted rail movement there is a continuous flow of package freight from the cars, in which the shipments arrive at the principal station of the road, to the containers destined for the substations. This is equivalent to an expansion of the capacity of each station in the terminal area. It is stated by officials of the Motor Company that the capacity of the terminal for handling less-than-carload freight was not even approached during the extraordinary heavy traffic year of 1920.

The elimination of the freight cars once used in ferry service and of the horse-drawn drays has also tended to increase the capacity of station tracks and added to the space available for the vehicles of shippers and consignees.

The motorized haulage of less-than-carload freight has

Fig. 6.—Outdoor Hoisting Equipment on Freight Station Platform

Fig. 7.—Motor Chassis Awaiting Demountable Body

eliminated additional handling of freight into and out of the station warehouses and has reduced the period of storage in the freight houses.

The cost of interchanging freight by motor truck and demountable bodies is about 50 cents per ton less than by horse-drawn dray. Estimates of the Motor Company show that the trucking of freight by motor costs the railroads 35 cents less per ton than transfers by trap or ferry cars. Over two hundred trap or ferry cars have been released from intraterminal service; there has been a saving of approximately $225 per day in per diem charges for the use of the cars, and the reduction in the amount of intraterminal switching movements has reduced operating expenses.

There has been a noticeable decrease in loss and damage to goods transferred between stations. The contracts of the Motor Company with the railroads place the responsibility on the hauling company for loss and damage to freight while in its care. The company has never been obliged to pay one loss or damage claim. There has been a decided decrease in the amount of claims in the whole Cincinnati terminal district, attributable, at least in part, to the improved transfer service by motor.

Where the horse dray and ferry car transfer service was rendered in Cincinnati, shipments that were "over" or "short" at the delivery stations could not be matched with the billing that covered the shipments for from 55 to 72 hours, *i.e.*, not until the cars were actually delivered to destination stations. The motor handling of the goods had reduced this time to one hour. As soon as each container is unloaded, the receiving station communicates with the station from which the goods are transferred, notifying the agent at the forwarding station of shipments that are "over" or "short." Searches for missing goods are made and, if found, they are forwarded in the next container.

Thus the goods are associated with the billing at once and loss and damage claims are avoided.

The results obtained through the substitution of motor for rail terminal service at Cincinnati may be summed up as follows:

1. A reduction in the average time consumed in the interchange of less-than-carload freight.
2. An increase in station capacity due to the fact that the freight station is not a place for storage but becomes a freight "funnel," and that it is possible to store in the containers a greater amount of freight per square foot of platform space than can be placed on the platform itself.
3. An increase in station track capacity due to the release of cars for other work, which formerly, when used in interchange service, were spotted on station rails.
4. A reduction in loss and damage. A total of 1,500,000 tons of freight was handled without any claims being filed for loss or damage.
5. A saving in transfer costs compared with the trap or ferry car method of handling freight between stations.

Mr. B. F. Fitch, President of the Motor Terminals Company, has suggested three possible extensions of the plan to be made in the future:

1. The elimination of the use of "trap" or "ferry" cars to and from industrial sidings.
2. The establishment of off-track zone stations, so that new industrial and commercial centers may be developed without regard to the proximity of railroad tracks, and
3. The movement of containers on flat cars between cities throughout the United States.

Mr. Fitch, in outlining the results ultimately to be achieved through terminal motor service, states:

The truck in intensive railroad terminal service is now being used in Cincinnati only for the interchange and consolidation of less-than-carload freight between railroad main-substation. The next step is replacing the intraterminal industrial trap car by the demountable bodies. . . .

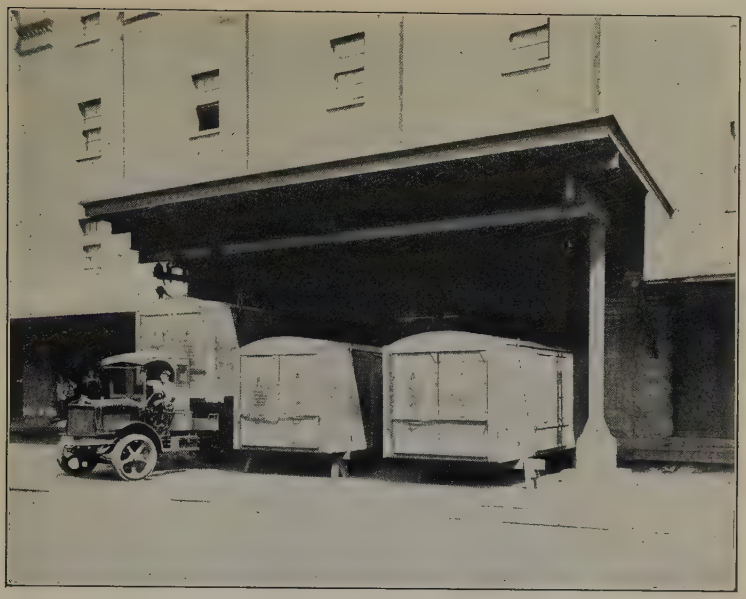

FIG. 8.—HOISTING THE DEMOUNTABLE BODY

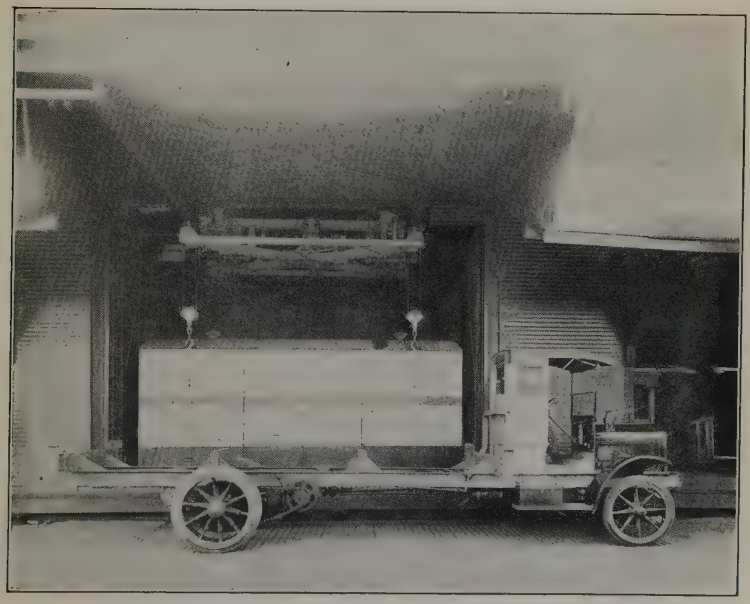

FIG. 9.—PLACING THE DEMOUNTABLE BODY UPON THE CHASSIS

With practically all trap car movements eliminated through equipment of railroads' freight stations and the larger industrial plants, the next logical step is the establishment of "off-track" zone stations for the development of new industrial centers without regard to proximity of rails, within reasonable trucking radius. Such off-track stations, as points of truck distribution and load reconsolidation, will afford opportunity for maximum haul of maximum loads, the economy of which has been established everywhere by operators of truck fleets. Here, inbound consignments can be segregated for their later store-door delivery. Outbound shipments can be consolidated at such zone stations for dispatch in full container loads to railroad main stations for transfers and uninterrupted dispatch to destination less intermediate rehandling delays.[1]

The use of unit containers and trucks, rather than the tractor-trailers used in St. Louis, is a feature of the Cincinnati terminal handling of less-than-carload freight. Mr. Fitch advocates containers as best adapted to transfer work.

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[1] B. F. Fitch, "Railroad Extensions without Rails," *Shippers' Advocate,* February 4, 1922.

CHAPTER VI

TERMINAL MOTOR FREIGHT SERVICES IN NEW YORK CITY

THE Borough of Manhattan, of New York City, is one of the world's most active business centers. To provide ingress and egress for the tremendous volume of merchandise freight traffic that pours into and out of the area daily, to support life, and to give an outlet to industry and commerce are difficult transportation problems.

Only the New York Central, entering from the north, has direct freight tracks leading onto the island; all other rail lines are obliged to use terminals located on the Jersey or Long Island sides of the harbor. The terminals in the districts separated from Manhattan Island by rivers or by the New York Bay are connected with the pier stations of the railroads and steamship lines in Manhattan through the use of car floats, lighters, barges, and towboats. Solid carloads of freight are floated across the harbor on car floats to the pier stations in Manhattan. Less-than-carload consignments and some carload freight shipments are unloaded from cars in the Jersey terminals into the lighters or barges, which are towed across the harbor to the pier stations where the goods are unloaded upon the piers. A relatively small proportion of the total volume of merchandise traffic is brought directly to freight stations on the island in freight cars, via railroad tracks. By far the greater part of the freight traffic must be handled by harbor craft after it arrives at the New York terminal, or before it starts its outward journey in line-haul service.

Car float and lighterage services have certain inherent disadvantages. The lighterage method of handling freight involves the transfer of the freight from cars into lighters

at the Jersey terminals, an extra handling of the goods that is costly to the carriers and increases the risk of loss or damage of the freight. Freight traffic is sometimes delayed at the terminals awaiting the unloading of cars and the loading of the lighters. After the goods are discharged from the lighters at the pier stations in Manhattan, it is necessary to handle the goods across the freight platforms and load them into trucks or teams. The volume of freight handled by harbor craft requires large railroad terminal facilities on both the Jersey and Manhattan sides of the harbor. Water-front property in the metropolitan district in New York is expensive to purchase or to lease. Harbor craft in large number must be owned or leased. Both of these methods are expensive. Moreover, the lighterage system of handling freight traffic congests the Jersey terminals and down-town water-front districts of Manhattan.

In order to reduce the handling of merchandise traffic by lighters, several of the carriers serving the New York metropolitan district inaugurated a system of handling freight traffic by local motor freight trucking companies, the purpose being to substitute motor for lighterage service, wherever possible and practicable.

The Erie Railroad Terminal Arrangement

The United States Trucking Corporation maintains five inland or off-track warehouse stations away from the water-front districts on Manhattan Island below Twenty-third Street in the down-town Manhattan delivery district.

The Erie Railroad hauls merchandise traffic destined to consignees in Manhattan to its terminals on the Jersey side of the harbor. Here the goods are taken from freight cars, and after being checked against the billing, are loaded directly into the trailers of the United States Trucking Corporation. The loaded trailers are hauled by tractors from the Erie terminal on the boats of the Chambers Street

Ferry of the Erie Railroad. From the ferry slips the goods without unloading the trailers were originally taken either to the store doors of the consignees, if the consignees preferred that store-door delivery be made, or to one of the inland warehouse stations of the United States Trucking Corporation. The direct haulage of the freight to the consignees' store doors from the railroad terminals has been discontinued since the decision of the Interstate Commerce Commission on the New York Delivery on Constructive Station Case decided by the Commission late in 1929. The freight is held at the inland freight stations for the usual period of 48 hours of free time, arrival notices being sent to the consignees advising them of the arrival of the goods, just as similar freight is handled at the regular freight stations of the line-haul carriers. The regular prevailing New York rates of freight are charged for this service.[1]

If the consignees elect to have the United States Trucking Corporation deliver the goods to their store doors, an additional cartage charge is added to the regular line-haul transportation rate applying to the inland warehouse station of the United States Trucking Corporation.

Outbound freight traffic from shippers on Manhattan Island for movement over the lines of the Erie is handled in precisely the same way. Shippers may arrange with the United States Trucking Corporation to call for their freight at their shipping platforms and have the goods hauled to the inland stations of the railroads. An extra charge is made for this service. The shipper may, if he chooses, deliver the goods to one of the inland stations of the Trucking Corporation by means of his own vehicle or by a hired truck. The goods are received at the station and taken by the Trucking Corporation's teams, trucks or tractors and trailers across the ferries to the proper out-

[1] Testimony in I.C.C. Docket 19715, May, 1928.

bound terminals. All merchandise freight, both inbound and outbound, now is required to be handled in such a manner that it passes through one of the inland freight stations of the United States Trucking Corporation.

The Lehigh Valley Plan

The Lehigh Valley Railroad has an arrangement similar in most respects to the plan used by the Erie Railroad. Freight is transferred by motor vehicles across the Liberty Street Ferry of the Lehigh Valley between the terminals of the railroad and the off-track stations of the United States Trucking Corporation. Prior to the fall of 1929 direct store-door service was offered to shippers and consignees. The railroad company arranges with the Trucking Corporation to haul the freight between the rail head and the rail carrier's inland stations, while the shippers or consignees contract with the Trucking Corporation for the store-door delivery and pick-up services.

Mr. A. C. McIntyre, General Freight Agent of the Lehigh Valley Railroad, testified in the Constructive Delivery Stations Investigation Hearings before the Interstate Commerce Commission that the Lehigh Valley was compelled to adopt this system of handling freight to and from Manhattan to avoid loss of competitive traffic.[2]

The Pennsylvania Railroad Service

The Pennsylvania system established motor terminal freight service in New York on June 1, 1927, through an arrangement with a local New York trucking contractor. An "inland" or "off-track" station, Laight-West Street Station, was established on Laight Street, running through from West to Washington streets, as a delivery point for all shipments of freight to consignees in New York City.

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[2] *Ibid.*

Certain articles such as fresh fruits, fresh vegetables, dairy products, raw silk and other articles were specifically excluded from the service.[3]

An outbound "inland" or "off-track" station, known as Watt Street Station, for the receiving of shipments of westbound freight, was established at the corner of Washington and West streets, to receive shipments, except raw silk and articles restricted by the rule of the New York Harbor Tariff referred to above, from consignors on Manhattan Island who wish to avail themselves of the service.

The Pennsylvania Railroad had "constructive" or "atmospheric" stations at the New York ends of the Holland Vehicular Tunnel and the Cortlandt and Desbrosses streets ferries from New Jersey to the Borough of Manhattan. The contract between the Pennsylvania Railroad and the trucking company called for the unloading of freight from cars at the Jersey City terminals and for the trucking of the freight to the constructive station by the haulage company at the expense and responsibility of the railroad company.

Outbound shipments, in the same way, were hauled from the "constructive" station by motor over the ferries or through the vehicular tunnel to the Pennsylvania's Jersey side terminals and there loaded into railroad cars. In these inbound and outbound services, the trucking company was the agent of and was compensated by the Pennsylvania Railroad. The railroad rates to and from New York applied to freight received or delivered at the "inland" or "constructive" stations.

The Pennsylvania Railroad did not assume responsibility for the carriage of the freight or for the compensation of the hauling company for the portions of the trucking service between the "constructive" station and the ware-

[3] For excluded and restricted articles see New York Harbor Tariff, Rule No. 25, P.R.R., G.O.-I.C.C.-14430.

houses and stores of shippers and consignees. The trucking company's position as agent of the railroad in connection with inbound shipments ceased when the goods arrived at the constructive delivery points, and began in connection with outbound shipments when these points were reached.

The trucking service between the "off-track" and "constructive" stations and the store doors, warehouses and shipping or receiving platforms of shippers and consignees was a matter for individual arrangement between the shippers or consignees and the motor company.

The Delaware, Lackawanna and Western Railroad Terminal Service

The Delaware, Lackawanna and Western Railroad established an extensive system of lighterage and local delivery freight station facilities in Jersey City and Hoboken, New Jersey, where trains of coal, grain, merchandise and other traffic are received for delivery to connecting railroads or steamship lines or for delivery to points within New York Harbor, and where trains of outbound traffic are made up after the freight is received from connections or from shippers in the New York district.

In addition to the terminals on the Jersey side of the Harbor the Lackawanna operates several pier stations on the North River and one on the East River on Manhattan Island, also the Harlem Transfer Station in the Bronx. Wallabout Terminal and Twenty-fifth Street Terminal in Brooklyn are operated by the Delaware, Lackawanna and Western as major receiving and delivery stations. In addition to these primary terminals auxiliary ones on the New York Dock Railway, the Bush Docks and on the Hoboken Manufacturers' Railway are maintained in Brooklyn, on the Jersey shore, and in Long Island City.

Traffic to pier stations and auxiliary terminals, the interchange of traffic, and the freight from the pier stations

and auxiliary terminals are handled by a fleet of lighters, open and covered barges, heated and refrigerated barges, car floats and tugs. A central billing station is maintained at the terminal at Hoboken where the billing is done for nine Delaware, Lackawanna and Western stations, four auxiliary terminals, and traffic received from other railroads, coastwise steamship lines and river steamboat companies in New York Harbor for movement via the Lackawanna.

Arrangements were made by the Delaware, Lackawanna and Western for handling traffic by motor between the company's terminals and shippers and consignees on Manhattan. Constructive stations were established at the Barclay Street, Christopher, and at the West Twenty-third Street Ferry stations. The Railway Motor Trucking, Incorporated, hauled freight between the Hoboken–Jersey City terminals of the rail carrier and the warehouses or stores of shippers and consignees. The trucking company acted as the agent of the carrier in connection with the movement of the goods between the railhead and the constructive station, and as the agent of the shipper or consignee for the movement between the constructive stations and the place of business of the shipper or consignee.

Inbound shipments were waybilled by shippers to West Street Station, New York City, and consigned care of the Railway Motor Trucking, Incorporated. The trucking company picked up the shipments consigned in its care at the Hoboken–Jersey City terminal without waiting for arrival notices to be sent to the consignees and without delay awaiting orders from the consignees to make the deliveries. The freight was loaded upon the vehicles at the freight sheds or car sides, trucked to the ferries, ferried across the river and delivered to the warehouses or stores of the consignees.

The rates published to New York by the Delaware, Lackawanna and Western applied to the constructive sta-

tions along West Street and the expenses of transfer from freight car or freight station to truck and of the cartage between the Jersey side terminal and the constructive stations were borne by the railroad company. The carrier paid the trucking company 8 cents per 100 pounds, without regard to the classification of the freight, for the motor terminal service to the constructive delivery stations. Here, it was assumed, the goods passed to the consignees by constructive delivery and the consignees paid the trucking company for the haulage service from the constructive stations to final destination. The rail carrier was responsible for the goods until they reached the constructive stations. Four cents per hundred pounds was added to the Delaware, Lackawanna and Western's proportion of through rates to cover terminal expenses if traffic came from connecting lines.

Outwardbound shipments were called for at the shippers' places of business in New York by the motor company upon orders of the shippers. The freight was hauled to the nearest constructive station and ferried to the Delaware, Lackawanna and Western Jersey side terminal. Here the goods were unloaded directly from the trucks to cars or station platform. Bills of lading were issued by the rail carrier and the freight was waybilled from the central billing office. The trucking company was paid by the shippers in accordance with individual contracts for cartage between the shippers' warehouses or stores and the constructive stations. The rail carrier paid the trucking agent an agreed upon amount per 100 pounds for the movement of the goods from the constructive stations to the rail terminal. From the through rates in freight for movement beyond the rails of the Delaware, Lackawanna and Western via connecting lines, four cents was deducted before prorating and this amount was added to the initial carrier's proportion. The responsibility of the rail carrier commenced at

the time the freight reached the constructive stations in the vehicles of the trucking company.[4]

The advantages of the coördinated railroad-motor terminal freight service, more efficient handling of traffic in the railhead terminal at Hoboken–Jersey City and the relief of congestion at the Manhattan pier stations, resulted in the use of this service by a considerable number of shippers and consignees in New York.[5]

The Baltimore and Ohio Motor Terminal Service

The Baltimore and Ohio Railroad on March 1, 1927, established a motor-railroad terminal freight service substantially similar to the services operated by the other trunk lines serving the New York terminal district. A constructive freight station was established at South Ferry Station, New York City, adjoining the Staten Island–South Ferry Station of the Baltimore and Ohio on Manhattan Island. Freight in carloads is handled through this station and the lighterage and terminal tariff of the rail carrier applicable in the New York Harbor district was amended by supplement, effective March 1, 1927, and by a later supplement effective April 4, 1927.

Inbound shipments of carload freight were unloaded from cars or from freight sheds at St. George Terminal of the Baltimore and Ohio Railroad on Staten Island to the vehicles of public truckmen and hauled by them through the constructive ferry station directly to consignees in Manhattan, Brooklyn and Queens. The public truckmen were under contract with the Baltimore and Ohio to perform the service as agents of the rail line in connection with cartage between St. George Terminal and the constructive

[4] D.L. and W.R.R. Tariff G.F.D. Circular No. 1553, Supplements and Reissues, I.C.C. No. 21315.

[5] A. M. Sullivan, "The Lackawanna and The Port of New York," *The Port of New York and Ship News*, March 26, 1926; and Letter, Nat Duke, GF.T.M., D.L. and W.R.R., July 21, 1927.

station and were responsible to the railroad. Inbound freight shipments were consigned in care of any one of the public cartage companies selected by the shippers or consignees and waybilled to South Ferry Station, New York City. New York rates applied to this station.

Outbound shipments were hauled from the stores or warehouses of the shippers to the constructive station by the selected teamsters as the agents of the shippers and at the expense of the latter. From this point the railroad company assumed full responsibility for the goods and compensated the trucking companies. Outbound shipments were dispatched from South Ferry Station as the point of origin. Shippers or consignees using the coördinated rail-and-motor service were required to arrange with one of the contract trucking concerns in advance and agree upon the rates they were to be charged between the constructive station and the warehouses or stores. The Baltimore and Ohio Railroad paid the cartage companies on a contract basis for their services in connection with the haulage of the goods between St. George Terminal on Staten Island and the constructive station on Manhattan.[6]

The tariff of lighterage and terminal regulations of the Baltimore and Ohio applicable at New York provided that all kinds of freight in carloads except waste paper and a list of restricted articles are eligible to receive terminal coordinated rail-and-motor service.[7] This list of excluded articles, like those published by other railroads performing this service in New York, included bulk freight, dangerous articles, explosives, articles of excessive sizes or weights, and other articles difficult or dangerous to handle by motor truck.

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[6] Baltimore and Ohio R.R., I.C.C. No. 20780, Supplement No. 6, Rule 2.

[7] For complete list of restricted articles, see B. and O., I.C.C. No. 20780, Rule 33.

The Central Railroad of New Jersey Service

The Central Railroad of New Jersey established trucking service between its terminals in Jersey City and Manhattan Island of the same character as the services discussed above, through arrangements with terminal trucking companies. A constructive station, known as North River Station, was established, June 15, 1927, and inbound and outbound shipments were handled between Jersey terminals and the constructive station by motor vehicle as described in connection with the other services.

The New York, New Haven and Hartford Railroad Service

Motor terminal trucking through constructive stations was also used by the New York, New Haven and Hartford Railroad. Mr. C. E. Smith, Vice-President of the New York, New Haven and Hartford, testified that the trucking of freight through a "constructive" station in lieu of floating it to and from pier stations was inaugurated to effect economies in operation. Better service to shippers and consignees was anticipated but was not the motivating influence. "It has been the hope and thought of the New Haven management that trucking could be enlarged to such an extent that it would 'dry-up' pier handling and lighterage entirely so that the pier division of the marine department of the railroad could be given up and the maximum economies effected."[8]

Advantages of the System

The carriers, shippers, consignees and the trucking companies agreed that under this system of handling merchandise freight traffic, there was an appreciable saving in

[8] Testimony in I.C.C. Docket 19715, May, 1928.

costs and time. An executive officer of one carrier testified before the Interstate Commerce Commission that economies of 20 cents per 100 pounds or $1.40 per ton had resulted to his company.[9]

The inland freight stations are located on the ground floors of warehouses, and the rental of space in these buildings is very much less than for high-priced water-front piers. A saving accrues to many small shippers and consignees because, being able to avail themselves of the lower-priced warehousing facilities, the goods may be bought in carload lots, part of the goods being consumed immediately and the balance stored until needed. This system of purchasing is used to advantage in place of buying in smaller than car lots, on which higher freight rates must be paid. Representatives of shippers and consignees of freight testified that handling freight at New York through constructive stations cost 50 per cent less than the costs of handling similar freight through pier stations.[10] The direct loading of freight from cars to trucks avoids the extra handling of the goods at the piers and faster service can be given both inbound and outbound. Mr. J. B. Dougherty, Traffic Manager of the Michigan Paper Mills Company, testified that delivery of freight was made within 24 hours after arrival in the terminal under the constructive station plan while 72 to 80 hours were required for delivery under the old plan.[11]

Terminal Trucking Charges

The terms of the contracts of the railroads with the trucking contractors provided that direct store-door delivery and

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9 Testimony of C. E. Smith, in I.C.C. Docket 19715.

10 Testimony of A. C. Boone, J. B. Dougherty, B. F. Williams, J. J. Neylan, J. A. McGuire, in I.C.C. Docket 19715 hearings, New York, May, 1928.

11 Testimony in I.C.C. Docket 19715.

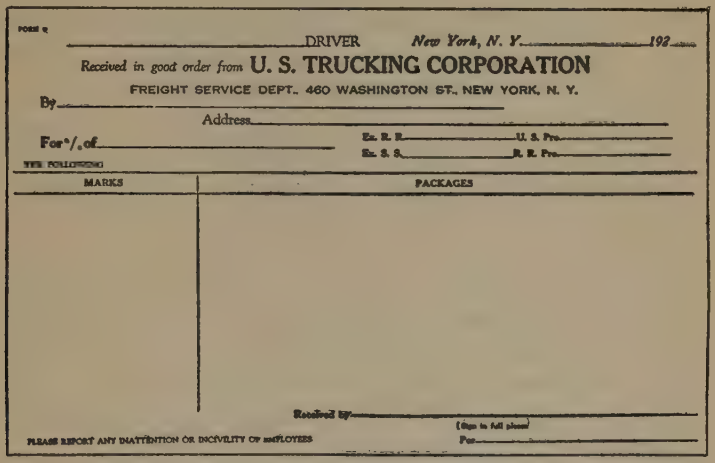
collection services might be obtained by shippers and consignees who desire either service. The railroads paid the trucking companies a portion of the through freight rates for cartage of the goods from the Jersey piers to the inland stations or to the ferry slips on Manhattan Island. This service was included in the through rate without extra charge to shippers and consignees. Since the freight was already loaded on vehicles of the trucking carriers, direct delivery could be offered to consignees, at lower rates than prevail under the usual unorganized cartage system where every shipper and consignee uses his own or hired trucks to deliver or receive his freight. If store-door delivery or pick-up was used by consignees or shippers, the railroad company absorbed out of its through rate the portion of the trucking charge, applying either to the inland warehouse station or to the ferry slip. From either of these points the shipper or the consignees paid the cartage companies for the collection or delivery services.

It has been stated by one prominent cartage company that the consignees in Manhattan are saved at least 60 cents per ton, because the goods are loaded by the carriers into the trucks at the Jersey terminals under the direct Jersey–New York system. Ordinarily the consignees would be required to arrange for the loading of the trucks at the pier stations in Manhattan if the goods were delivered to these stations. In addition to the saving in loading costs, there is said to be further economy for the consignees in the difference between the normal trucking charges of the teamsters in Manhattan and the lower rates of the railroad trucking contractors made possible through heavier loading. Accurate comparisons are not obtainable.

Shipping Arrangements

In handling outbound freight traffic through an inland station, the cartage companies weigh, check, and inspect

the shipments and receipt the bills of lading of the railroads that are to haul the goods tendered by the shippers. The trucks haul goods to the ferries, and take them across to the Jersey terminals. An abstract of the information contained on the duplicate copy of the bill of lading is entered in triplicate on an abstract such as that shown in Figure


FORM 6

DRIVER *New York, N. Y.* 192

Received in good order from **U. S. TRUCKING CORPORATION**

FREIGHT SERVICE DEPT. 460 WASHINGTON ST. NEW YORK, N. Y.

By

Address

For */, of

Ex. R. R. U. S. Pier

Ex. S. S. R. R. Pier

THE FOLLOWING

MARKS	PACKAGES

Received by

(Sign in full please)

For

PLEASE REPORT ANY INATTENTION OR INCIVILITY OF EMPLOYEES

FIG. 10. RECEIPT FORM FOR OUTBOUND FREIGHT OF THE UNITED STATES TRUCKING CORPORATION

10. One of the copies is retained at the inland station; the other two are attached to the original and duplicate bills of lading and sent with the driver to Jersey City terminals. The contents and billing of each truck are checked by the railroad companies at the Jersey terminals, and a receipt for the freight is given to the representatives of the cartage companies. Exceptions noting shortage, damage or errors are made in connection with this receipt.

In handling inbound freight, the trucking companies give the railroads receipts for the goods in the form of tallies and delivery records. This tally sheet is signed by

the driver of the vehicle taking the goods from the railroad terminal. One copy is taken with the goods to the inland freight station for a check-off there. A copy of this list is then filed as a permanent record and the consignee gives the trucking company a receipt for the freight when the goods are taken from the inland station. The form is shown in Figure 11.

The bills of lading covering freight delivered directly to the railroad freight stations by the cartage companies are receipted by the railroad company when the vehicles of the trucking companies deliver the goods at the inland terminals. The trucking companies pay the freight charges if the charges are to be prepaid, and submit to the shippers the executed bills of lading together with a bill of the freight charges.

On inbound direct delivery freight, the railroads make out tally sheets similar to that shown in Figure 11. One copy of this document is retained by the railroads as their receipt, and the duplicates are retained by the trucking companies as their record of the transactions. The cartage carriers list the contents of each vehicle on their own delivery form. This form contains a complete description of the articles, the name of railroad carrier from which the goods have been received, and that of the consignee to whom the goods are to be delivered. The line delivering the goods obtains the consignee's receipt for the goods. This receipt is retained as a permanent record by the trucking carrier. See Figure 12.

Restricted and Excluded Articles

The carriers' lighterage circulars governing the terminal trucking arrangements list more than 120 articles or groups of commodities that are not accepted by the rail carriers for delivery through the inland stations, and are not reserved through these stations for outbound movement.

ERIE RAILROAD COMPANY

UNLOADING TALLY AND DELIVERY RECORD

Car Initial_____ Car Number_____ Track_____ Date_____

Seals North Side_____ South Side_____ East End_____ West End_____

Condition of Drip Pans_____ Drain Pipes_____ Car Floor_____

Quantity of Ice in Tanks_____ Time Load Started_____ Finished_____

U. S. Truck Number_____ Public License Number_____ Checker's Name_____

Driver's Name_____ Truck Dispatched to_____

MAKE DAMAGE NOTATIONS DIRECTLY BENEATH ENTRY TO WHICH THEY APPLY, SHOWING NATURE, EXTENT AND APPARENT CAUSE OF THE DAMAGE

CONSIGNEE'S NAME AND MARKS	ADDRESS	KIND OF PACKAGE	TALLY.	TOTAL

RECEIVED ABOVE PROPERTY FROM ERIE RAILROAD COMPANY IN GOOD ORDER

Sheet Number_____ Total Sheets_____ Driver's Signature_____

WHEN MORE THAN ONE SHEET IS USED ON ONE CAR, ALWAYS SHOW CAR NUMBER ON EACH SHEET, ALSO NUMBER OF SHEETS USED

MAKE NO NOTATIONS ON BACK OF THIS SHEET

Form 9[illegible]

FIG. 11. UNLOADING TALLY AND DELIVERY RECORD FORM OF THE ERIE RAILROAD COMPANY

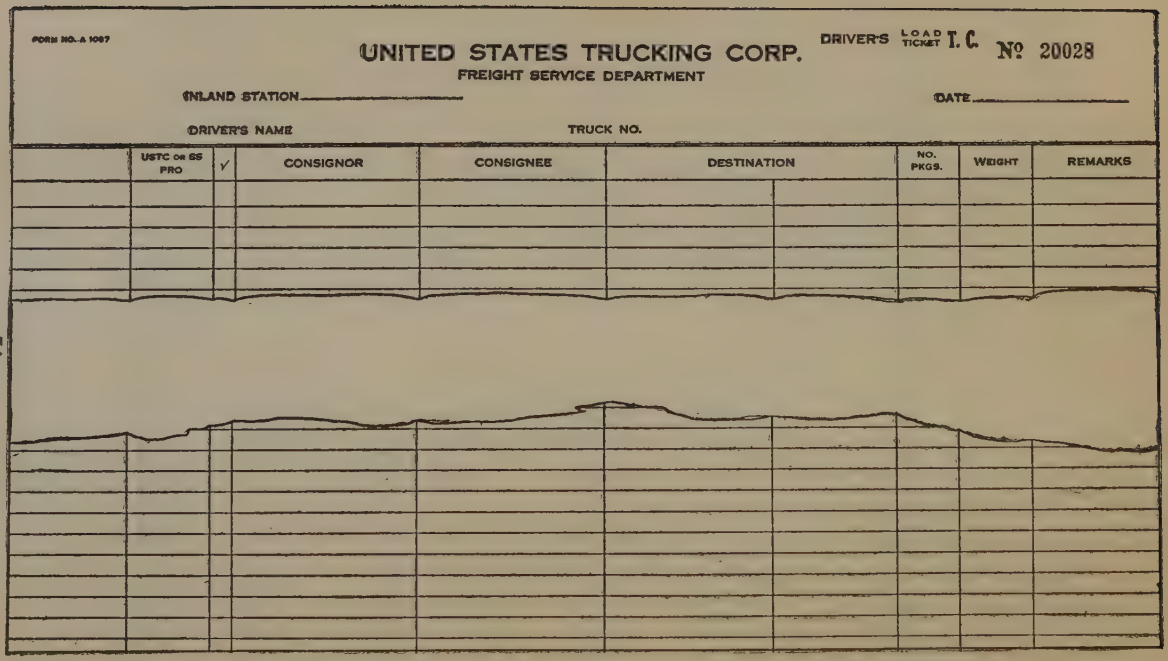


FIG. 12. DELIVERY RECEIPT FORM OF THE UNITED STATES TRUCKING CORPORATION

The list includes freight in bundles, packages or pieces weighing less than 15 pounds per unit (with certain exceptions specifically noted), freight in per bags, and freight in bulk requiring shoveling or forking in handling.[12]

Other excluded or restricted commodities include liquid acids in glass carboys, articles weighing over ten tons per unit, burnt cotton, fresh or green fruits or vegetables, plate or other glass in boxes with united outside measurement of more than 120 inches, household goods except when boxed, boats, live stock and live poultry, petroleum and petroleum products, powder, high or low explosives, and vehicles of all descriptions except when fully boxed or crated.

The Interstate Commerce Commission and New York Trucking

The Interstate Commerce Commission, without formal pleading having been filed, entered upon a hearing, in 1928, concerning the lawfulness of the rates, regulations and practices of the carriers maintaining terminal trucking and constructive stations in New York. After the investigation has been docketed supplements were issued cancelling or altering the arrangements. The Commission suspended the cancellation supplements and ordered that no changes be made in the rates or practices until November 25, 1928, unless otherwise ordered by the Commission, pending the disposition of the investigation proceeding. Hearings were held in New York during May and June, 1928.[13]

Testimony in these hearings indicated that the railroads generally desired to abandon constructive station service

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[12] For a typical list of excluded and restricted articles, see Rule 11 A, Supplement No. 14, D.L. and W., G.F.D. Circular No. 1553, I.C.C. No. 21315, Pages 3 and 4.

[13] I.C.C., Docket 19715, Constructive Stations and Trucking in Lieu of Lighterage in New York City and Vicinity.

but to retain motor trucking in lieu of lighterage wherever practicable, although disagreeing on the method of handling freight to be substituted for constructive station service if the Interstate Commerce Commission permitted its abandonment.

Many of the rail carriers in the New York terminal have been expanding and improving their freight terminals in the New York area. This, coupled with the changed conditions of competition introduced by the constructive station delivery system, probably has caused the carriers to seek to abandon constructive station service, and has led at least one railroad to wish to abandon trucking service in lieu of lighterage.

Mr. G. C. Woodruff, then Assistant Freight Traffic Manager of the New York Central Railroad, testified in the hearings before the Interstate Commerce Commission that the New York Central had no constructive delivery stations nor any inland stations, and that this company wished to stand with most of the other carriers serving New York terminals for the abandonment of the trucking service which for ten years had been used in place of lighterage. Loss of traffic to other carriers resulting from offers of better rates due to constructive station service was urged as the reason for the change.[14]

Mr. J. W. Roberts, General Superintendent of Transportation, Eastern Region, Pennsylvania Railroad, in recommending the abandonment of constructive station service by his company, testified that the experience of the Pennsylvania Railroad in eleven months of operation of constructive stations from June, 1927, to May, 1928, had been disappointing. The expectation was that a large percentage of merchandise traffic would be handled by a single operation through the constructive stations and that the inland

[14] Testimony in I.C.C. Docket 19715 hearings, New York, June, 1928.

stations would be relieved. Inland stations were operated satisfactorily and terminal delays were reduced by motor trucking to and from them, but a comparatively small volume of carload merchandise traffic was handled by the Pennsylvania Railroad through constructive stations, and the new business expected to be attracted by the service was not obtained. Delays in the Jersey terminals exceeded expectations; outbound traffic through the stations was very light and rumors of the manipulation of the charges for trucking beyond the constructive stations were reasons advanced for wishing to abandon both constructive and inland station services. Mr. Roberts expressed the apprehension that the alleged manipulation of trucking charges beyond the constructive stations, charges over which the carriers have no control, would lead ultimately to free terminal freight delivery without adequate compensation to the railroads.[15]

Shippers and consignees of freight, merchants associations, and administrative bodies in the New York district are unanimous for the maintenance of constructive and inland freight station service. They urge that the use of motor freight trucking in connection with the railroads is a reasonable, natural and economic development of terminal service which should be maintained, encouraged and fostered under suitable regulations.

Counsel for the New York Port Authority explained that the testimony of this organization was based upon the assumption that the fundamental principles of interstate commerce and the purpose of the Port Authority were economy in transportation for both carriers and shippers, the attainment of practices and methods that are most economical under conditions peculiar to New York and the

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[15] Testimony of J. W. Roberts, I.C.C. Docket 19715, New York, May, 1928.

elimination of any wasteful discrimination or unlawful practices that may have developed.[16]

The program of the Port Authority is stated as follows by its Deputy Manager:

1. Off-track or inland station service is sound for Manhattan Island and should be continued, but in the interest of efficiency and economy to both carriers and merchants, railroad individual off-track stations should be converted into universal stations as rapidly as possible. The Port Authority is preparing to provide the necessary station facilities on Manhattan Island.
2. The principle of direct delivery of carload freight is sound. The soundness of the principle rests in the fact that there is a through trucking movement from the freight car door to the consignee's place of business, which does away with the need for station facilities and eliminates extra handling. The principal objectionable feature of the constructive station, as I see it, can be met by requiring the payment of an extra charge for this service by shippers and consignees to cover the cost of loading and unloading the trucks at the rail terminals so as to make the service comparable to team track delivery in other sections of the port.
3. Trucking in lieu of lighterage should be limited to steamship piers and connecting lines, and confined to cases where the entire delivery obligation rests on the railroads, and should not be permitted in instances where consignees are expected to pay some indeterminate part of a through movement.

Mr. Wilson testified that the problems of terminal delivery at New York are so complicated, because of the geographical situation, that advantage should be taken, under existing law and in conformance with the duly published tariffs, of every possible medium of terminal delivery, be it lighter, car float, truck or railroad. Some deliveries can best be provided in certain sections of the port by one facility and in other districts by different facilities.

In general two fundamental principles should govern:

[16] Statement of Wilbur S. LaRoe, and testimony of Billings Wilson in I.C.C. Docket 19715.

1. Platform facilities should be provided in all sections for less-than-carload freight, and,

2. Service or services to team track delivery should be available in all sections of the port for less-than-carload freight.[17]

The Merchants' Association of New York favored the extension of constructive and off-track station service to embrace a system of store-door delivery. Mr. William H. Chandler, Manager of the Traffic Bureau of this organization, did not concur in the proposal of the Port Authority to permit additional charges for trucking between consignees' and shippers' places of business and the railroads' constructive stations.[18]

The operation of constructive stations was abandoned by the railroads serving New York on September 25, 1929, as a result of the decision of the Interstate Commerce Commission, in the Constructive Station Case, which favored the use of motor vehicles in the terminal freight service but which found that the constructive station facilities brought competitive abuses. The present system continues the use of the inland stations but eliminates the use of constructive stations which the Commission looked upon as dangerous competitive weapons which tended to create violations of the Interstate Commerce Act. The carriers have replaced constructive stations with inland freight stations and a modified form of store-door delivery and collection service. If this new service proves to be successful, the carriers propose to establish additional inland freight stations and to extend the optional store-door freight service so as to permit, finally, the abandonment of a large part of the piers of the railroads on the North and East Rivers now used for the handling of carload and less-than-carload merchandise freight.

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[17] Testimony of Billings Wilson, in I.C.C. Docket 19715.

[18] Testimony of William H. Chandler in I.C.C. Docket 19715.

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CHAPTER VII

THE CHICAGO TERMINAL SERVICES

THAT Chicago is the greatest inland center of the railroad freight distribution of the United States is shown by the statistics of the volume of traffic handled by the rail lines serving the terminal district. Like many other large American cities, Chicago has a serious terminal problem and automotive freight equipment is used in coördination with rail facilities to relieve terminal congestion both in an underground tunnel and on the streets.

The Chicago terminal area spreads in an irregular crescent from Waukegan, Illinois, north and west of Chicago on Lake Michigan to Porter, Indiana, the eastern end of the district. The crescent is broad in the center and also widens to the south, southeast and southwest of Chicago to include towns served by the railroads entering the district. It gradually tapers off to the shores of Lake Michigan at Waukegan and Porter, which are the horns of the crescent. The district includes approximately 1,750 square miles. There are 37 steam railroads and they are connected by inner, middle and outer belt lines as well as by several other terminal railroads. There are 7,726 miles of railroad trackage serving more than 4,300 industries connected with the rail tracks and many thousand more business establishments that ship and receive goods through the railroad freight stations. It is estimated that approximately 4½ per cent of the aggregate tonnage of freight traffic in the United States is unloaded in the Chicago area.

The Committee on Coördination of Chicago Terminals conducted a three-year survey and analysis of the traffic of the district. The figures in Table VIII indicate the huge

size of the district and tremendous volume of traffic that flows into, through, and out of the district. The report of this committee is an instructive work in transportation economics. It represents painstaking labor in compiling data of great value not only to the railroads and shippers

TABLE VIII

STATISTICS OF TRANSPORTATION FACILITIES AND SERVICES, CHICAGO TERMINAL DISTRICT

Number of railroads	37
Daily freight car movement	34,791
Percentage of freight car movement, loaded or unloaded in the district	87
Percentage of freight car movement passing through the district without being loaded or unloaded	13
Daily average number of employees engaged in handling terminal movement	82,850
Freight train arrivals daily	307
Freight train departures daily	302
Total freight train movements daily	2,349
Daily average freight car miles	1,150,138
Locomotives in service daily	701
Terminal trackage including main track, yards and sidings, miles	7,726
Industries with direct track connection	4,330
Local inbound loaded freight cars daily	7,893
Local outbound loaded freight cars daily	4,811
Intraterminal movement of loaded freight cars daily	3,634
Less-than-carload tonnage inbound, daily	11,670
Less-than-carload tonnage outbound, daily	17,830
Cars placed for unloading daily	11,527
Cars unloaded daily	11,378

of Chicago but to every student of transportation problems. It is a valuable inventory of the transportation facilities of a great terminal and a motor record of the flow of traffic through it. It is regrettable that the terminal situation in other cities has not been analyzed in the same way so that attempts to improve terminal transportation services may be made with accurate knowledge of the actual conditions.

Chicago has no physical obstacles to contend with com-

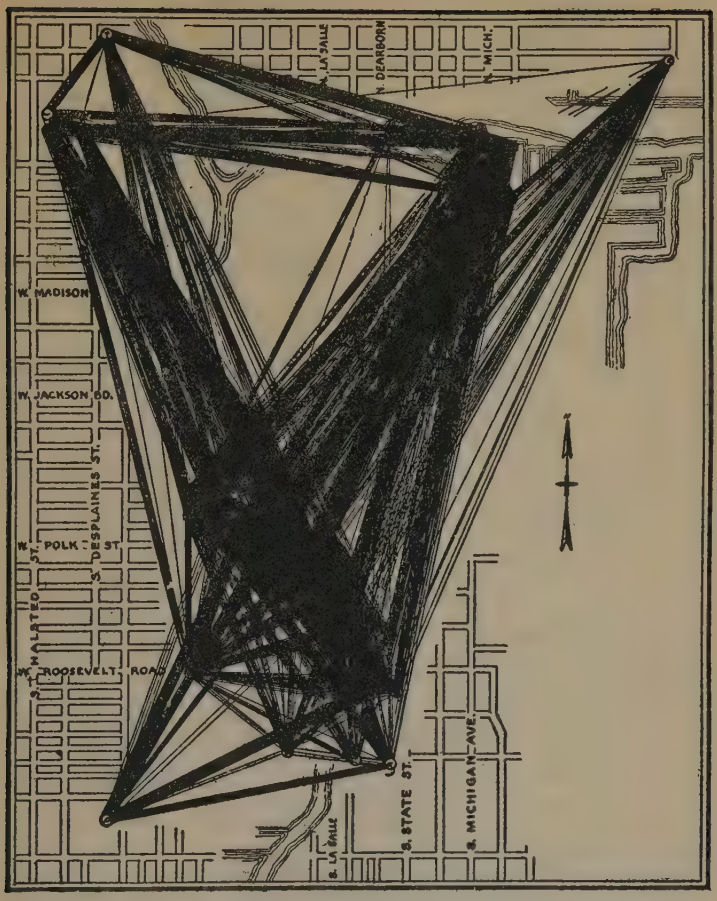

FIG. 13. TERMINAL TRUCKING MOVEMENTS IN CHICAGO

From *Facts and Figures of the Automobile Industry*, National Automobile Chamber of Commerce.

parable with the Mississippi River at St. Louis, the river and bay at New York or the surrounding heights at Cincinnati. The district fronts on Lake Michigan between the horns of the crescent give a long stretch of water front for terminals. The lake is a valuable asset to the city. The narrow Chicago River is bridged for railroads and highways at so many places that it offers no serious barrier to the flow of traffic. The city, however, has a difficult terminal problem due to the fact that a large number of railroads maintain less-than-carload freight stations in a small central area comprising a few square miles in the heart of the business district. Under present conditions this is not the best location for freight stations. Chicago's problems as a traffic center are also affected by the fact that there are many important industrial communities along the railroad lines radiating in all directions except northeastward from the central terminal area.

Nearly all the railroads in the Chicago district bring less-than-carload freight for consignees in the central section of Chicago to the freight stations in the down-town section and forward outbound less-than-carload shipments from the same stations. Approximately 2,100 cars of outbound traffic and 1,100 cars of inbound freight are cleared through the freight stations of the district daily. Not all of this traffic finds its way to or originates at the central city stations, but a substantial part of it does. In order to maintain their competitive positions the railroads have been obliged to maintain these freight stations where real estate values are high and where traffic congestion is severe.

Approximately half of the less-than-carload freight originating in Chicago is hauled by the shippers to the railroad freight stations, and about the same amount is drayed from the stations to the store doors of the consignees. Most of the less-than-carload traffic is merchandise freight and the handling of a daily average movement of 11,670 tons of

inbound and 17,830 tons of outbound traffic is a huge task. This class of traffic requires the maximum amount of labor and attention in the freight houses and necessitates a great amount of cross routing of vehicular traffic between the railroad stations and industrial establishments, warehouses and stores.

Inbound and outbound less-than-carload freight is also delivered to or moved from private industrial sidings and warehouses by trap or ferry cars, lighterage or tunnel service. The distribution of inbound and outbound traffic as a whole, both carload and less-than-carload, among industrial siding service, team track service and freight station, is stated by the Coördination Committee report to conform to the daily average figures shown in Table IX. The railroads absorb the expense of trap and ferry car service out of the through less-than-carload rates, provided the requisite minimum amount of less-than-carload freight is contained in each trap or ferry car.

Lighterage is used to transfer freight between industries located on the river and the dock stations of the railroads. The Merchants Lighterage Company performs this service as an agent of the carriers that originate or deliver the freight.

The Underground Tunnel Service

In addition to trap and ferry car and lighterage services, the carriers in Chicago make use of a tunnel under the center of the city to move less-than-carload freight. The tunnel is connected by elevators with the platforms of railroad freight stations, with certain stores and industries and with several universal off-track stations which are used for all traffic received or forwarded in connection with railroad service by the tunnel company. Shippers and consignees whose establishments are connected with the facilities of the tunnel company are relieved of the neces-

TABLE IX

DAILY DISTRIBUTION OF FREIGHT TRAFFIC IN THE CHICAGO TERMINAL DISTRICT

INBOUND TRAFFIC

Class of Service	Daily Average Cars	Percentage of All Inbound Traffic
Deliveries to individual industries	6,025	76.4
Deliveries to railroad freight houses	1,108	14.0
Deliveries to team tracks	760	9.6
TOTAL, all inbound	7,893	100.0

OUTBOUND TRAFFIC

Class of Service	Daily Average Cars	Percentage of All Outbound Traffic
Movements from individual industries	2,429	50.5
Movements from railroad freight houses	2,118	44.0
Movements from team tracks	264	5.5
TOTAL, all outbound	4,811	100.0
GRAND TOTAL	12,704	

sity of trucking their freight to and from the railroad freight stations.

Shippers and consignees who have no connection with the tunnel truck freight to and from its universal stations. The tunnel company acts as an agent for the rail lines using the tunnel. Costs of transferring goods between the railroad stations and the stations of the tunnel company, or

to or from the platforms of shippers and consignees having tunnel connections, are absorbed by the carriers. Shippers and consignees make their own arrangements at their own expense for the haulage of the goods between their places of business and the off-track stations of the tunnel company.

It costs the carriers in Chicago approximately 10 cents per 100 pounds, $2.00 per ton, to handle less-than-carload freight in the terminal, by trap or ferry car, lighterage or tunnel. The tunnel has somewhat relieved congestion and expedited the movement of goods between railroad stations and shippers and consignees, and the same is true of the transfer of goods between major and minor freight stations of the same railroad and of the interchange service between different railroads. Ferry cars have been and still are extensively used in station-to-station intrarailroad transfer and in interrailroad interchange services.

Highway Motor-Rail Coördination

Motor highway equipment is now used at the Chicago terminals by several railroads, including the Wabash and the Chicago, Rock Island and Pacific, to augment railroad facilities. The service of the former is typical.

The Wabash Railway installed motor tractor and trailer service early in 1927 between four of its stations in Chicago through contract with the Arthur Dixon Transfer Company. The primary purpose of the service was the elimination of delays in interstation transfer which when performed by railroad freight cars averaged between 24 and 72 hours per transfer. The work was contracted to be done by an established motor haulage company rather than performed directly by the railroad, it was announced, because of the lack of experience of the personnel of the railroad in motor truck operation.

Motor tractor-trailer service is operated between the

central district freight station of the Wabash Railway at Polk Street, Forty-ninth Street Transfer Station, Twelfth Street Station and Englewood Station. There is a continuous service from Polk Street to handle outbound less-than-carload shipments directly to the transfer stations, in this way eliminating switching movements to the transfer house. The outlying and central stations are able to forward all outbound less-than-carload freight to the transfer station to be loaded in destination or other transfer cars the same day the goods are received from shippers. Inbound shipments are distributed by motors from the transfer to the delivering station the day that the cars are unloaded at the transfer house.

The trailers used in this service are of all-steel box type construction, 18 feet in length, 9 feet in height, and 8 feet in width. They, as well as the tractors, are owned by the Arthur Dixon Transfer Company and bear the insignia and names of the Wabash Railway Company Transfer Service and of the hauling company. The vehicles are operated and supervised by the haulage contractor, but the labor for loading and unloading is supplied and supervised by the railroad company. Each trailer is locked and sealed by employees of the railroad and they only may break seals, unlock and unload the vehicles.

Although the motorized transfer service is so new that positive statements are of doubtful value, officers of the railroad company state that carefully kept records indicate that the motor haulage is both more rapid and less expensive than railroad freight car transfer service.

Two sets of package cars are placed daily, one set at Forty-ninth Street Station, and the other at the Polk Street Station of the Wabash in Chicago. These cars are for various destination stations on the rails of the Wabash or of connecting lines. Less-than-carload shipments are brought from the respective stations of origin in Chicago

by motor, loaded directly to the proper package cars and forwarded from the terminal the same day. This method of handling has resulted in faster service, increased the average loading per package car, and decreased the number of cars required for road-haul package-car service.

Improved service to and from smaller cities and towns along the line of the Wabash and its connections has resulted from the installation of the motor tractor-trailer for trap or ferry car service. Not only are delays in movement from the stations of origin to the transfer station eliminated, but the concentration of all outbound less-than-carload shipments at either the Polk Street or Forty-ninth Street Station makes it possible for the railway to load daily destination or transfer cars for smaller cities and towns where cars were loaded only on alternate days or on several days a week under the older system of transfer by railroad car.

Consignees in all sections of the Chicago district who use the Wabash are benefited by the motor service, for all merchandise received at the transfer station from points on the Wabash or transferred from connecting lines is delivered to the destination stations in the Chicago district the same day it is received.

Merchandise received at the transfer stations in trap cars from industries, and less-than-carload traffic from or to connections which requires transfer service, is also hauled the same day to cars, delivering stations or the transfer stations of connecting carriers in the district.

Shippers and consignees in the Englewood section of the Chicago terminal district are especiallly benefited by the tractor-trailer freight service which compares favorably with that given in the sections of the district served by major freight stations. Inbound less-than-carload freight is delivered by motor service to the delivering freight station the day it arrives at the transfer station down town, and outbound less-than-carload shipments are moved from

the originating station and forwarded from the transfer the day received.

Mr. R. A. Walton, Assistant General Freight Agent at Chicago, and Mr. E. Haney, Superintendent of the Chicago Terminal Division, are the officers of the Wabash Railway who supervised the installation of the motor service. Mr. Walton states that, previous to the inauguration of the motor service, hundreds of trap car loadings had to be made each month in accomplishing the transfer of freight between the Forty-ninth Street and Polk Street stations, and that this frequently meant delays of from 24 to 72 hours. Complaints because of these delays have been entirely eliminated since the installation of motor service. It is now possible to send out all freight in package cars bound for the destination points, or break-bulk points, the night of the same day it is received by the carriers. Incoming freight received at the transfer station can be delivered either to the Polk Street Station or Englewood Station the same day it is received.

The motor service of the Wabash Railway in Chicago, in general, is stated to have resulted in more expeditious terminal freight service at lower cost to shippers, consignees and the carriers per unit of freight handled.

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CHAPTER VIII

RAIL-MOTOR LINE-HAUL COÖRDINATED FREIGHT SERVICES

THE railroads of the United States for a number of years past have been operating local way freight or peddler train services at rising operating costs. Less-than-carload or package freight in short-haul movements has rarely been profitable to the railroads and in many instances it is handled at a loss. Way freight or peddler trains, in which the traffic is handled, are necessarily slow because they serve stations along the route; the tonnage per train mile is small, the handling of freight at stations is expensive and rates that would make the traffic profitable would prevent the shipment of goods.

The short-haul problem has been made more acute in recent years by the motor truck which has become an important carrier of less-than-carload freight over short distances. Much of this transportation is done for hire by more or less permanently established and regularly operated motor lines on the highways, but a large part of it is by means of trucks operated by industries carrying their own products to or from their plants. This has materially decreased the volume of traffic moving on the way freight or peddler trains on the railroads, but has not relieved the railroads as common carriers from performing the services to which they are obligated by statutory or charter requirements.

Many railroads are meeting this situation by operating trucks from station to station as auxiliaries to the freight train service, where the character of the traffic and other conditions warrant. The advantages resulting from utilizing motor vehicles as a substitution for way freight or

peddler service are an expedited service resulting in increased traffic speed in handling, greater satisfaction of patrons of the railroads, greater efficiency and economy in operation, and the meeting of the competition of independent trucking concerns.

In many instances the use of motor trucks to replace way freight or peddler train service has resulted in an expedited movement. Traffic is moved from the important merchandise shipping centers in cars hauled to advantageously located zone stations from which goods are promptly taken by motor trucks to other stations. Before trucks were thus used it was the practice to concentrate the traffic at the more important zone stations from which freight was sent in local way or peddler cars to its destination the following day. This added a day to the transit time from point of origin to destination.

Traffic offered at the smaller stations for shipment has been expedited by using motors to concentrate traffic at the terminal or zone stations in time to be forwarded the same day. The local trains formerly arrived at the terminal too late for yard classification and placement of cars at terminal stations in time for handling the freight the same day, with the result that traffic could not be forwarded until the following day.

Patrons have found the regular service of the motor truck at the smaller stations with definite arrival and leaving time and daily schedule to be of great advantage. The railroads have also benefited by the elimination of the local way or peddler freight train which interfered with the through freight trains. The line movement of traffic handled has been accelerated.

When and where the character and volume of less-than-carload traffic will permit of the substitution of motor trucks for local way freight or peddler trains, a reduction in direct train operating expenses has resulted. There has

TABLE X

Motor Trucks in Line Haul, Pennsylania Railroad, 1928

Eastern Region

Office, General Superintendent of Stations, Transfers and Motor Service. October 3, 1928.

Unit No.	Date Started	Location		Route Mileage	No. Stations Served	No. of Trucks
		From	To			
1	1- 8-23	Salisbury, Md.	Cambridge, Md.	92.5	12	2 5-ton
3	11-22-23	Overbrook, Pa.	Downingtown, Pa. ..	27.2	27	2 5-ton
4	11-26-23	Paschall, Pa.	Chester, Pa.	8	9	1 5-ton
8	2-18-24	Camden, N. J.	Trenton, N. J.	40	21	2 5-ton
9	2-18-24	Trenton, N. J.	Perth Amboy, N. J...	49	15	2 5-ton
10	3-24-24	Trenton, N. J.	Flemington, N. J....	28	16	1 5-ton
11	7- 7-24	Torresdale, Pa.	Trenton, N. J.	17	8	1 5-ton
12	2- 4-24	Claymont, Del.	Port Deposit, Md....	49	19	2 5-ton
13	3-31-24	Trenton, N. J.	Linden, N. J.	60	24	2 5-ton
15	4-13-24	Seaside Park, N. J..	Mt. Holly, N. J.....	48.8	22	1 5-ton
16	4-15-24	Perth Amboy, N. J...	Seaside Park, N. J..	52	28	2 5-ton
17	4-15-24	Sea Girt, N. J.....	Jamesburg, N. J. ...	28	15	1 5-ton
18	5-19-24	Walnut St., Phila....	Whitings, N. J.	79	30	2 5-ton
20	6-23-24	Trenton, N. J.....	Phillipsburg, N. J...	51	15	2 2-ton
22	7-21-24	Camden, N. J.	Elwood, N. J.	37	19	1 5 ton
23	7-21-24	Newfield, N. J.	Somers Point, N. J...	36	17	1 5 ton
29	10- 6-24	Portsmouth, Va.	Port Norfolk, Va. ..	3	2	1 2½-ton
30	5- 1-25	Salisbury, Md.	Crisfield, Md.	34	12	2 3½-ton
34	6- 1-25	Walnut St., Phila...	West Chester, Pa. ..	34	29	3 5-ton
44	1-10-28	Downingtown, Pa. ..	Lancaster, Pa.	37	19	2 5-ton
46	1-26-28	Brenford, Del.	Felton, Del.	38	7	1 3½-ton
21 routes				848.5	364	34

Central Region

Unit No.	Date Started	Location		Route Mileage	No. Stations Served	No. of Trucks
		From	To			
2	7- 9-23	Pittsburgh, Penn St.	Rochester, Pa. ...	26	19	1 5-ton
5	11-26-23	Alexandria and Sewickley	Branches	58 24	20 5	1 5-ton
6	1- 2-24	Pittsburgh, South Side	Elrama, Pa.	62	16	1 5-ton
14	3-17-24	Redstone Junction ..	Youngwood, Pa. ..	35	11	1 5-ton
19	7- 2-24	Rochester, Pa.	Columbiana, Ohio	24	7	1 2-ton
21	6- 2-24	Columbiana, Ohio ..	Alliance, Ohio	26	7	1 5-ton
24	8- 1-24	Massillon, Ohio	Wooster, Ohio ...	30	14	1 5-ton
26	1- 2-24	Courtney, Pa.	W. Brownsville ..	17	18	1 5-ton
33	2- 2-25	Brownsville, Pa. ...	Mather, Pa.	24	14	1 5-ton
35	3-18-25	Pittsburgh	Verona, Pa.	24	14	1 5-ton
36	5-18-25	Harmonville	Logans Ferry	47	11	1 5-ton
37	7- 1-25	Dennison, Ohio	Marne, Ohio	20.5	11	2 3½-ton
38	1- 4-25	Steubenville, Ohio ..	Bellaire, Ohio ...	46	15	1 3½-ton
40	1- 3-27	Corliss	Burgettstown			1 5-ton
41	7- 1-27	Greensburg	Sewickley Br. ... Hempfield Br. ... Youghiogheny Br.	76	14	1 5-ton
42	12- 1-27	W. Brownsville	Dunbar and Newcomer	60	19	1 5-ton
43	7- 6-27			33.5	12	1 5-ton
45	2- 6-26	Cuba, N. Y.	Portageville, N. Y.	56	15	1 5-ton
18 routes		Carnegie, Pa.	Washington, Pa. .	689	242	21
Grand Total, 89 routes				1,537.5	606	55

been a saving at stations by a reduction of the physical handling of traffic and of loss and damage claims.

The substitution of motor trucks for local way freight or peddler train service has enabled the railroads to recover some of the traffic previously lost to independent trucking companies. The expedited service and regularity of schedules have helped to hold traffic from going to competitive motor trucks.

Pennsylvania Railroad Line-Haul Coördination

The Pennsylvania and New York Central were the first railroads to substitute motor trucks for local way or peddler freight trains. The Pennsylvania Railroad began at Cambridge, Maryland, in January, 1923, when the Baltimore, Chesapeake and Atlantic Railway, a subsidiary of the Pennsylvania Railroad, operating boat lines from Baltimore to various points on the Eastern Shore of Maryland, as well as a connecting railroad to Ocean City, Maryland, took over the operation of a motor trucking company that had previously been a competitor. Merchandise from Baltimore to points on the railroad line was given a coördinated motor and steamship service, traffic being moved to Cambridge by steamer, thence to destination by a fleet of motor trucks. This was Unit No. 1 of the Pennsylvania's coördinated rail and motor services.

The plan was extended from time to time when and where economical and practicable until in 1928 the Pennsylvania Railroad operated 39 motor truck routes in replacement of local way freight trains. The route mileage was 1,537.5, and there were 606 stations utilizing 55 motor trucks, the majority of which were of five-ton capacity.

A statement showing the number and location of the coordinated line-haul units of the Pennsylvania Railroad is shown in Table X.

The New York Central Railroad Coördinated Line-Haul Motor Truck Freight Service

The New York Central Railroad has used motor trucks in steadily increasing numbers for several years in connection with railroad freight service in fields which seemed to offer possibilities for economizing in operation or improving the service, or both. The services include the station-to-station motor service in lieu of way freight service, service between stations on the same railroad division to avoid the handling of the freight at intermediate transfer stations, hauling by motor from the smaller to the larger stations to make straight carloading from the larger stations so as to improve time in transit and to reduce expenses, hauling by truck from central delivery stations to small outlying stations where final delivery is made to consignees, interchange service between railroad and steamship lines in place of lighterage service, and the trucking of carload bulk commodities and unit containers of less than carload merchandise. This service includes the use of unit container freight cars. This special form of coördinated freight service is discussed in Chapter X.

The transportation of less-than-carload freight by motor trucks was inaugurated by the New York Central as an emergency measure in January, 1923, in the Buffalo district at a time when the railroad was confronted with a serious box car shortage. Trucks were used to relieve this situation as well as to reduce congestion at freight stations and transfer points by carrying goods between freight stations of the New York Central in the vicinity of Buffalo and between stations of the New York Central and other roads. Later, trucks were also used for interchange of freight between the docks of the lake steamship lines on the Niagara frontier and the railroad stations.

The advantages of trucking in the Buffalo district and

on the Niagara frontier territory were so clearly demonstrated that study was made of operating conditions at other points on the New York Central system, with a view to extending the service. Conditions at Rochester, being found to be similar to those in the Buffalo terminal district, led (on November 28, 1923), to the installation of a terminal trucking service and the installation of a motor service between Rochester and stations within a radius of 23 miles of the city. Later a similar service was started on a number of other divisions. Motor haulage of less-than-carload freight was in time extended to the divisions serving the New York district, and a number of trucking unit installations were established in the territory between Syracuse and New York.

Local less-than-carload freight was formerly handled by way freight trains, which started out of the terminals with cars of merchandise freight, loaded in station order, destined to stations along the various divisions of the road. The freight was unloaded from these cars at the way stations by the train crews. The New York Central has been able to eliminate two or three way freight trains on each division through the substitution of motor trucks. In addition to this, the use of motor vehicles has made it possible to reduce overtime by avoiding the interference of way trains with other trains. These savings have resulted in economies in wages, coal and other supplies.

The portions of the line where motor trucking is in effect are divided into a number of zones. One station in each zone is selected as the "zone station," and all inbound freight for stations in a zone is unloaded at the zone station, from which the freight is trucked to the destination station. In the same way all outbound freight from the zone is trucked to the zone station to be loaded for points beyond the zone, the freight from one station to another in the zone being hauled direct to destination by motor truck.

The zone stations are at or near the centers of the zones, and the trucking distance in each direction from the zone station is usually from ten to thirty miles, which permits of at least one round trip and, in some cases, two round trips per day.

The New York Central does not operate its own motor vehicles, but contracts with independent companies to perform the services. Mr. G. C. Woodruff, Assistant Freight Traffic Manager of the New York Central, states that the purposes of the policy of utilizing the services of motor companies have been to stimulate local goodwill rather than to incur ill will by performing the services with the railroad's own vehicles, and to make use of going organizations, experienced in motor truck operation.

Trucks or tractors and trailer equipment are used, whichever types or combinations are best adapted to serve local conditions.

Motor trucking, as employed by the railroad, started from nothing, and has developed without preconceived plans. As its trucking activities assumed relatively large proportions, the effort of the railroad has been to determine whether and when trucking activities are justified or not as compared with railroad operation. To do this the railroad has had to weigh both the favorable and the unfavorable factors affecting trucking operation in a given sphere of activity.

The railroads seek to improve the service, to recognize the obligation of the carrier to the public to offer constantly improving service, to achieve actual monetary economies where such savings are possible, to eliminate duplications of service, and to use transportation equipment and facilities to the best advantage.

"Where all of these factors and many minor ones can be combined, the result is plain, but there are many trucking activities in which the results, while intangible and

difficult to set down in black and white, are nevertheless important, all of which must be considered."[1]

Several other railroads have variations of line-haul motor-rail coördination. One of these, that of the Boston and Maine, is discussed in Chapter IX.

The Long Island Railroad Motor-Rail Freight Service

The Long Island Railroad uses motor tractors and semi-trailers in freight service between the New York terminal district and points on Long Island. The equipment is owned and operated by the Motor Haulage Company, Incorporated, of Brooklyn, New York. Motors have replaced the railroad cars which formerly were used in connection with car floats in distributing less-than-carload freight between the railroad company's terminals in New York terminal districts and the outlying stations on Long Island.

Freight formerly was brought by freight cars to the Bushwick Terminal on Long Island from the stations of the railroad company at Pier 22, East River, Manhattan; Flatbush Avenue Terminal in Brooklyn; and from New York City. This service is now performed by tractors and semi-trailers. The freight which filled the railroad cars to only a small percentage of their capacity is sufficient to load fully the semi-trailers. Tractors replace the locomotives, car floats and tugs used in this service and the semi-trailers take the place of the freight cars.

When the service was all-railroad, the cars containing merchandise freight were floated on car floats from Pier 22, New York City, to Long Island City. There being no direct rail connections between the freight stations of the Long Island Railroad in Brooklyn, the interchange of

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[1] G. C. Woodruff, "Modern Handling Methods of Railroad Transportation with Special Relationship to the Terminal Problem," paper before A.S.M.E., Philadelphia, April 23, 1928.

cars between the stations required several days to accomplish.

A freight car was loaded daily at each terminal station, Pier 22, East River, New York, Long Island City, Flatbush Avenue Terminal and Bushwick Terminal, for each division or peddler car route of the railroad on Long Island. These four cars contained freight for each way station on each division of the road. Four freight cars were required to serve each station at which all four cars had to be opened and partly unloaded.

By means of motor tractors and semi-trailers freight is interchanged among the terminal stations daily, and as certain stations are designated as those from which less-than-carload cars are daily loaded for certain stations on various Long Island Railroad divisions, it is possible for one railroad car to replace four cars formerly used.

At the stations of the Long Island Railroad in the terminal district, the inbound freight is transferred directly from the freight cars to the waiting semi-trailers which are hauled to Bushwick Terminal to discharge their loads into way freight cars that are run to the stations along the railroad line.

Freight collected at way stations along the railroad line for points in the terminal district of New York or beyond is generally handled by railroad freight service to Bushwick Terminal, and is distributed thence by the tractors and semi-trailers to the destination stations for delivery in the terminal area, or to stations from which it moves forward by rail.

The Motor Haulage Company owns and operates a large fleet of tractors, semi-trailers and motor trucks, and specializes in railroad and industrial terminal handling. The work for the Long Island Railroad is performed under contract. The motor company is compensated for its service by the railroad and is responsible to the latter for the

freight in its possession. The costs of the service are met out of the freight charges, the railroad company being responsible for the freight of shippers and consignees under the terms of the uniform bill of lading contracts. Mr. W. F. Banks, President of the Motor Haulage Company, Incorporated, states that the volume of freight handled by the company is approximately 100,000,000 pounds annually.

The substitution of tractor and semi-trailer equipment for railroad freight cars, car floats, locomotives and tugs in this service has been advantageous to the rail carrier in several ways. Locomotive and tug equipment has been released for other more efficient services in the harbor; the number of peddler or way cars has been reduced and those actually used are loaded more nearly to carrying capacity; the reduction in the number of way cars has increased the amount of track space available for other cars at freight stations and transfer houses; car movements through the congested terminal district have been materially reduced; and the detention of freight moving in and through the terminals has been lessened by several days. Quicker movement, fewer cars, and heavier car loadings have been made possible.

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ACKNOWLEDGMENTS

BANKS, W. F., President, Motor Haulage Company, Incorporated.

STACKHOUSE, R. K., General Superintendent, Stations, Transfers and Motor Service.

CHAPTER IX

THE BOSTON AND MAINE COÖRDINATED HIGHWAY FREIGHT SERVICE

The Boston and Maine Railroad first introduced motor trucking for railroad freight train service in the summer of 1925. The system now includes the collection from shippers and direct delivery to consignees of freight by motor truck, the movement of the freight over the highways instead of over the rails, and the use of motor trucks to replace way freight trains. Boston, Lowell and Lawrence, Massachusetts, were first connected by this plan of motor-highway service, and the operations have been extended from time to time.

The use of motors for transporting freight had been under consideration by officials of the Boston and Maine for several years before the service was actually established. The purpose of the coördination of rail and motor was to give a better service to shippers and consignees, to make possible economies in operation for the benefit of the carrier, and to relieve street congestion in Boston, Lowell and Lawrence in the interests of the general public.

The motor service is managed by the Boston and Maine Transportation Company, a subsidiary company of the Boston and Maine Railroad. One transportation system unites the local line-haul of the railroad with the pick-up delivery service by motor vehicles, and also includes a motor-highway service by trucks between a number of cities and towns in Massachusetts, Maine and New Hampshire. This all-highway motor freight service was installed to take the place of that offered by local freight or peddler trains.

The trucks of the Boston and Maine Transportation Company pick up less-than-carload freight at shippers' places of business and deliver such shipments directly to consignees in the cities and towns where the service is offered. Goods for destinations not served by motor trucks are hauled to railroad freight stations and freight arriving by rail at these stations is delivered to consignees by the Transportation Company, the responsibility as a common carrier being assumed. The consignee, instead of waiting for an arrival notice and then arranging with a local trucking company for drayage, receives his merchandise by motor directly from the freight stations of the railroad, and the goods sometimes arrive before the arrival notice could be delivered.

The cartage service within the cities is performed by local trucking firms. The Boston and Maine has announced that its policy of using existing cartage facilities is to establish a system of rail and highway-and-rail services by uniting existing instrumentalities of transportation rather than by entering into competition with existing motor carriers in the cities. Duplication would increase costs and highway congestion. The local motor trucking concerns are operating under the supervision and control of the Boston and Maine Transportation Company.

The supervision and management of motor service by the Boston and Maine Transportation Company, rather than by the railroad itself, has been resorted to because of the experimental nature of the service and because the operation of the service requires special attention to details with which the railroad has not had experience.

Rate Arrangements

The freight rates are based upon four classes of service:

1. Station-to-station service without cartage at either point of origin or destination.

2. Station-to-station service with cartage at one end.
3. Station-to-station service with cartage at each end.
4. Only cartage service within the cities or towns.

The rates are graded in units of 100 pounds according to the volume of shipment, decreasing per 100 pounds as the amount of freight increases. They are graded also by zones, so that for pick-up from or delivery to points within the zones nearest to the railroad stations in each city the charges are lower than those applying between a station and a more distant location within the city. The application of the rates is indicated by the following example:

A shipment of 1,000 pounds or less of merchandise freight of any kind, excepting articles specifically excluded,[1] moving from the Boston terminal of the carrier to its terminal at Lowell, Massachusetts, is charged for at the rate of 20 cents per 100 pounds. The rate is 34 cents per 100 pounds for a shipment of the same goods from any point in the zone that includes down-town Boston to the interior zone at Lowell. These rates are then scaled down gradually in three steps: a lower rate for shipments weighing between 1,000 and 4,999 pounds; a still lower rate for consignments weighing from 5,000 to 9,999 pounds; and a third and still lower basis of charges for shipments weighing 10,000 pounds or over. Officials of the Transportation Company state that these rates are based upon the results of a study of the actual costs of transportation and that the continuance of these schedules depends upon the experience of the company in operation. The rates are subject to change without notice, and are not subject to regulation by the Massachusetts or the Interstate Commerce Commission. All shipments are subject to minimum charge in effect at shipping point and destination, as shown on pages 107 and 108.

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[1] See list of restricted articles on pages 108 and 109.

The rates tabulated in Table XI do not apply to articles named in a list of exceptions embracing a large number of articles of unusual size, or of great value, or articles of great bulk as compared to weight. All rates are for weight of goods dispatched by one shipper to one consignee in one consignment. Local cartage rates are stated in Table XII.

TABLE XI

BOSTON AND MAINE TRANSPORTATION COMPANY THROUGH DELIVERY RATES PER ONE HUNDRED POUNDS

To and from Boston, Mass.	From and to Lowell and Lawrence, Mass.			
	Terminal	Zone No. 1	Zone No. 2	Zone No. 3
Shipments under 1,000 pounds				
Terminal	$0.20	$0.24	$0.31	$0.35
Zone 1	.30	.34	.41	.45
Zone 2	.38	.42	.49	.53
Zone 3	.43	.47	.54	.58
Shipments of 1,000 to 4,999 pounds				
Terminal	$0.19	$0.23	$0.28	$0.32
Zone 1	.28	.32	.37	.41
Zone 2	.34	.38	.43	.47
Zone 3	.39	.43	.48	.52
Shipments of 5,000 to 9,999 pounds				
Terminal	$0.18	$0.22	$0.26	$0.29
Zone 1	.26	.30	.34	.37
Zone 2	.31	.35	.39	.42
Zone 3	.35	.39	.43	.46
Shipments of 10,000 pounds or over				
Terminal	$0.17	$0.21	$0.22	$0.25
Zone 1	.24	.28	.29	.32
Zone 2	.27	.31	.32	.35
Zone 3	.30	.34	.35	.38

TABLE XII

BOSTON AND MAINE TRANSPORTATION COMPANY LOCAL CARTAGE OR STORE-DOOR DELIVERY RATES TO AND FROM TERMINALS AT BOSTON, LOWELL, LAWRENCE RATES PER ONE HUNDRED POUNDS

To and from	Minimum Charge	Shipments of Less than 1,000 lbs.	Shipments of 1,000 to 4,999 lbs.	Shipments of 5,000 to 9,999 lbs.	10,000 lbs. or Over
Boston					
Zone 1	$0.50	$0.12	$0.09	$0.08	$0.07
Zone 2	.60	.18	.15	.13	.10
Zone 3	1.00	.23	.20	.17	.13
Lawrence					
Zone 1	.40	.09	.08	.07	.06
Zone 2	.50	.16	.13	.11	.07
Lowell					
Zone 1	.40	.09	.08	.07	.06
Zone 2	.50	.16	.13	.11	.07
Zone 3	.60	.20	.17	.14	.10

The articles that are excluded from service standard rates are handled at special rates agreed upon by the shipper and carrier. A few typical restricted or excluded articles are:

Acid in carboys or demijohns
Agricultural implements

Baby carriages
Baskets
Bone black (lampblack)
Brick—loose

Caskets and coffins
Cork
Cotton, in bags
Cotton linters

Electrical lamp bulbs
Excelsior

Feathers
Furniture

Leather, loose
Lumber, loose

Machines, machinery (all kinds)
Millinery goods
Musical instruments and parts thereof

Paper scrap in bags or bales
Pianos
Pictures

Rags

Safes and vault doors
Show cases
Signs, electric
Statues and statuary

Glass in packages exceeding 5 ft. in length or height
Glass globes or shades
Hats and caps
Hides or skins
Iron and steel products, exceeding 20 ft. in length
Store and office furniture and fittings
Vehicles, automobiles, motorcycles, trucks, bicycles, and parts thereof.
Woodenware
Wool, in bags

Cartage Contractors

The Big Three Incorporated Transfer Company has contracted with the Boston and Maine Transportation Company for the door-to-door service in Boston. The line-haul service by motor truck between the cities is performed by N. F. Smith and Company. The local operations at other towns are performed by ten local cartage contractors. Other trucking firms already established are to be brought into the plan eventually, the Boston and Maine announces, as the service is extended to other cities and principal towns on the company's lines.

The motor transportation company maintains traffic solicitation and operating organizations separate and distinct from the corresponding departments of the railroad, but the entire service of the Boston and Maine Transportation Company and the contract carters is under the supervision of a Superintendent of Trucking of the controlling carrier. Sixty-eight trucks were used in the service in 1928.

The development of the motor truck line-haul and door-to-door service of the Boston and Maine Railroad is interesting and instructive to students of railroad and automotive transportation because it is one of the most important experiments in store-door delivery and pick-up service in connection with a railroad that has been started since the abandonment of the older system of store-door delivery by the Pennsylvania and Baltimore and Ohio Railroads, in

Baltimore and Washington. This service is discussed in Chapter XIII.

Concentration Station Service

An important development of the motor service of the Boston and Maine was made in July, 1928, when it was extended to include seventy additional stations in Massachusetts, Maine and New Hampshire. Under the extended service solid cars of less-than-carload freight are made up at the principal concentration stations, from which the freight is forwarded by railroad freight service. Inbound less-than-carload shipments for points within the jurisdiction of a concentration station are there received and distributed by motor truck to the local stations, or in some cases to the store doors of the consignees. The number of stops of way freight trains is reduced and many of the trains have been eliminated. Goods are less time in transit and operating costs are lower.

The concentration centers now include Lowell, Massachusetts; Lawrence, Massachusetts; Dover, New Hampshire; Nashua, New Hampshire; Salem, Massachusetts; Manchester, New Hampshire; Newburyport, Massachusetts; and Biddeford, Maine.

Stations served by less-than-carload motor trucking showed a gain of 40 per cent in the number of shipments for the first six months of 1928 over the number for the corresponding period of 1927 before the service was installed at certain stations. The tonnage gain averaged 88 per cent, and every station showed a material increase. The highest gain in tonnage was 269 per cent and the highest in number of shipments was 138 per cent. These figures are especially worthy of attention when it is considered that the period from which they are derived was one of slack business.

Coördinated motor-rail freight service with store-door

delivery is demonstrated to be attractive to shippers and consignees.

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CHAPTER X

CONTAINER CAR SERVICES

One of the most notable improvements in railroad transportation during recent years is the development of containers, or unit containers as they are usually called, for the handling of merchandise and certain types of bulk freight. They are large boxes into which the freight is loaded at the shipping platforms at the originating points. The containers, locked or sealed, are hauled by motor trucks to the railheads where they are transferred to railroad freight cars. The consolidation of many small shipments into single containers minimizes packing, reduces the number of pieces to be handled, increases the size of the units handled, lessens the number of rehandlings, increases the safety with which the goods are handled, and effectively prevents pilferage.

Merchandise freight in less-than-carload lots constitutes a relatively small percentage of the total volume of the freight traffic of American railroads, but its handling requires a disproportionate amount of railroad rolling stock and freight handling facilities. The percentage of loss and damage claims arising from the transportation of less-than-carload freight is also very high. In a representative recent year the less-than-carload traffic of Class I railroads amounted to 3⅓ per cent of the total volume of traffic transported, but this traffic required 25.7 per cent of the equipment and the loss and damage claims paid by the carriers were 32.2 per cent of the amount of all claims paid.[1]

[1] Tentative Report, Attorney Examiner Flynn, in I.C.C. Docket 18000, 1928.

Cost studies were made by the United States Railroad Administration during the period of Federal control of railroads at 88 representative cities in the eastern section of the United States. These surveys showed that the average cost of handling less-than-carload shipments was 10.4 cents per 100 pounds at each terminal, or 20.8 cents for the two terminal handlings. Unit containers were experimented with in order to economize railroad equipment and facilities, to expedite the movement of less-than-carload freight and to reduce the amount of loss and damage claims on this class of traffic.

Although the general use of containers is very recent the principle is not an innovation in transportation. A patent was granted by the Patent Office of Great Britain in 1845 for shipping containers embodying present-day features, but the containers were then used to facilitate the interchange of traffic between railroads of different gauge. Detachable and demountable freight car bodies containing freight were used in the United States by early railroads at interchange points where difference in track gauge made it impossible to interchange the freight cars. The railroads of France, Italy and other European nations before 1900 used various types of containers to a greater or less extent.

In 1910 a comprehensive container proposal was placed before the British Board of Trade. One central freight station was proposed to serve London. The station was to be a several-storied building completely equipped with transfer trucks, overhead cranes, runways, chutes, ropeways, conveyors, and containers. Small consignments of goods were to be loaded by the traders at their places of business into containers that were to be transferred to the central freight station by motor lorries. Here the containers were to be lifted by mechanical handling devices on to railroad cars adapted to receive them. At the desti-

nation stations the containers were to be shifted to motor vehicles and taken to the store doors of the consignees.

This plan would have required the equipment of all railway stations with handling equipment and motors and it was estimated that an expenditure of a billion and a half dollars for new equipment and for adapting existing facilities would be required. After an investigation by Parliament, the plan was rejected in 1920.[2]

The New York Central Railroad Service

After a period of experimental operation in 1920 and 1921, the New York Central established a container car service in 1922. Low side gondola cars 47 feet in length by 9 feet 3½ inches in width are equipped with guides into which the containers are fitted. The specially constructed containers of 438 cubic feet have outside dimensions of 7 feet 2½ inches in width; 8 feet 2½ inches in height; and 9 feet 3½ inches over guides in length. The inside dimensions are 7 feet in width; 7 feet 1 inch in height, at the eaves; and 8 feet 10 inches in length. Each container is provided with "eyes" at the four top corners and lifting straps by means of which they are lifted from truck to car or from car to truck. The guides and slots with which the cars are provided hold each container firmly in place, preventing side sway and shifting.

The containers are water tight and are equipped with close-fitting doors which are locked by the shippers with their own individual padlocks and keys and are unlocked by the consignees. The containers are placed in the cars door-to-door to prevent access to the doors while in transit. The locking of the doors and the placing of the containers door-to-door effectively prevents pilferage. The containers weigh approximately 3,000 pounds each and carry a maximum load of 8,500 pounds of miscellaneous merchandise

[2] *Railway Gazette*, London, January 2, 1920.

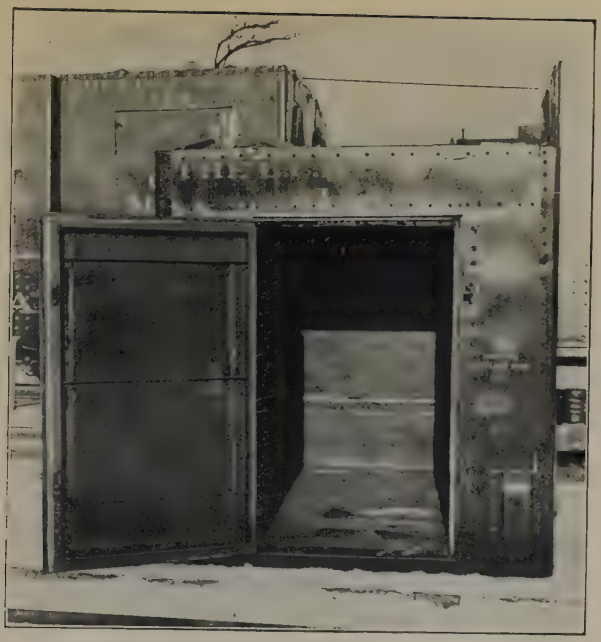

FIG. 14.—A FREIGHT CONTAINER USED BY THE L. C. L. COMPANY

FIG. 15.—LOADING L. C. L. FREIGHT CONTAINERS

freight. Six containers constitute a battery for each car.

Container car service for merchandise freight is used by individual shippers who have sufficient tonnage to forward solid container loads to single consignees, or by consolidators, who accept goods from several shippers for more than one consignee. Small consignments are thus consolidated into solid container loads which are distributed by motor trucks at destination.

The containers are brought to the railroad freight stations by motor vehicles and lifted by a gantry crane to the freight cars. At each station where container car service is available such cranes are provided to load and unload the containers from truck to car or from car to truck, no extra charge being made by the railroad company for the cranage.

Specially constructed containers are also used by the New York Central Railroad for handling brick between the Hudson River producing points and the New York metropolitan district. These containers hold 3,000 bricks each; 12 container loads to the car weigh 132,000 pounds. The containers are also used for other heavy building materials, such as stone, lime and ore, and are equipped with dump bottoms to facilitate unloading.

Rates for Container Car Service

The railroad rates for the transportation of freight in container car service differ radically from those applicable to the same goods in ordinary less-than-carload or carload shipments. They are neither class nor commodity rates but special charges made upon the loaded container and are based upon mileage, there being a minimum weight per container, with graduated scales of charges for weights in excess thereof.

This system avoids any difficulties in connection with the rules of the Consolidated Freight Classification which

provide that mixtures of several classes of goods in one package or in a car are to be rated at the class applicable to the highest rated article in the package or carload shipment and at the total weight of the mixed consignment.[3] The rates of the New York Central Railroad provide for a flat mileage rate per container, a charge for a minimum weight and distance, a surcharge for increased valuation, and an extra charge for each container loaded to a weight of 4,000 pounds or less, with an additional charge of ¼ cent for each mile of transportation service for each additional 500 pounds or fraction of this additional amount, subject to a scale of minimum charges. These charges range from $11.80 per container between New York and Utica, 236 miles, to $21.90 between New York and Buffalo, 438 miles, and to $31.00 between New York and Cleveland.[4] Not more than 7,000 pounds of freight may be loaded in one container.

The carrier publishes detailed specifications as to containers that will be accepted for transportation and no containers except those complying fully with these specifications may be used.[5]

Containers are received and delivered only at designated stations where crane service is available. Thirty-third Street Station in New York City; Carroll Street, Buffalo; Kent Street, Rochester, and the main stations at Syracuse and Utica are those designated on the company main line. On the New York Central between New York City and Buffalo, Erie, Pennsylvania, and Cleveland, Ohio, on the Lines West, and Boston and Springfield, Massachusetts, on the Boston and Albany Railroad are typical container stations.

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[3] See Consolidated Freight Classification No. 5, Rules 10 and 12.

[4] New York Central Railroad Local and Joint Freight Rate Tariff, I.C.C., N. Y. C. No. 15730.

[5] *Ibid.*, Note A, page 6.

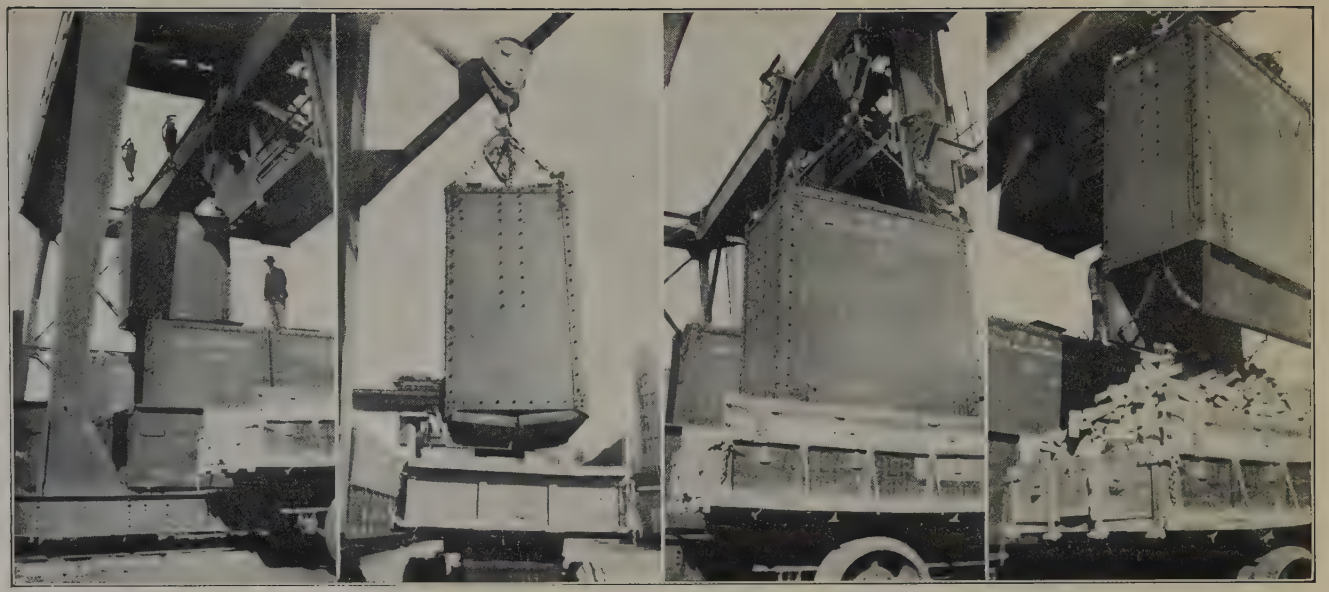

Fig. 16.—Handling Brick in Containers

Uniform bills of lading are used to cover the transportation of the containers and their contents, each bill being endorsed as shipper's load and count and shipper's weight. The bill of lading must show the number of the container and weight of the contents, and a signed statement by the shipper must accompany the bill specifically enumerating

TABLE XIII

TYPICAL CONTAINER CAR RATES OF THE NEW YORK CENTRAL RAILROAD

Between New York City, 33rd Street Station, and	Distance via New York Central Railroad	Rate per Container of 3,000 Pounds per Mile	Extra Charge per Mile Each 500 Pounds or Fraction Thereof	Minimum Charge per Container
	Miles	*Cents*	*Cent*	
Boston, Mass.	300	5	¼	$15.00
Utica, N. Y.	236	5	¼	10.62
Cleveland, Ohio ..	620	5	¼	31.00
Erie, Pa.	525	5	¼	26.25
Syracuse, N. Y. ...	289	5	¼	14.45
Kent Street Station, Rochester, N. Y.	370	5	¼	18.50
Springfield, Mass..	289	5	¼	14.45
Carroll Street Station, Buffalo, N. Y.	438	5	¼	21.90

the contents of each container and the gross weight of the goods. Articles of exceptional value are accepted at extra rates upon shippers' declared valuation. The shippers must declare or agree in writing to the value of the goods of this nature that are loaded in each container. If the values so declared do not exceed the values provided by the tariff provisions, the standard container weight, mileage

rates are applied. When the values exceed the values provided by the tariff, extra percentage surcharges are added to the standard rates, unless the declared values exceed the maximum which the tariff provides for goods that the carriers will accept for transportation, in which case the goods will not be received for carriage.

The declared or agreed valuation by the shipper is a released value and a notation of this must be made upon the bill of lading accompanying each shipment of goods upon which the restrictions apply.[6]

Shipments made subject to the common law liability of the carrier as modified by the laws of the United States or of the state of New York are transported under a special receipt or bill of lading endorsement. The rates are 10 per cent higher than those applicable when a uniform bill of lading is used, if the freight is transported otherwise than under the uniform bill of lading.

Demurrage at the rate of 50 cents per day is assessed upon containers detained beyond 24 hours by shippers, consignees, or their representatives. As the New York Central has available for service only a limited supply of steel cars equipped for the carriage of unit containers, it will accept only containers complying with the specifications published in its tariffs and to the extent of the availability of the equipped cars, the acceptance of container shipments being in the order in which the containers are offered for transportation.

All commodities, ordinarily shipped at less-than-carload or any quantity rates, are accepted for transportation excepting articles of dimensions such as will prevent their being loaded into the containers in such a manner as to permit the proper closing and locking or sealing of the doors.

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[6] *Ibid.*, Note C, page 6.

FIG. 17.—DEMOUNTABLE BODIES USED BY THE CINCINNATI MOTOR TERMINALS COMPANY

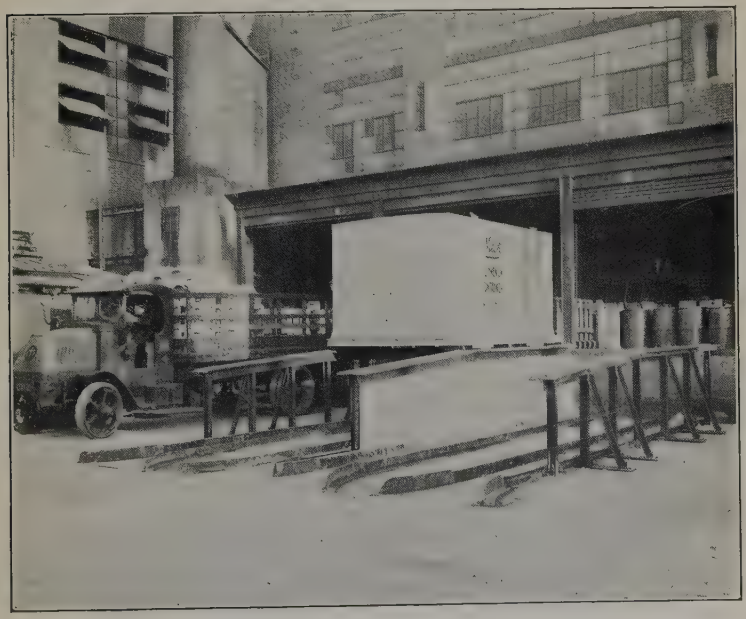

FIG. 18.—HANDLING CONTAINERS BY THE RAMP TRACK METHOD

Other Container Car Service Plans

Several other railroads use container car services of the one or another of several types. The Lehigh Valley Railroad and the Pennsylvania Railroad have installed services between selected stations on their systems, and extensions of the service on other railroads are being planned as this goes to press.[7]

The Cincinnati Motor Terminals Company uses demountable bodies in interchange service at Cincinnati, Ohio, as was described in Chapter V. These bodies are essentially unit containers that are demountable truck bodies equipped to be hauled on flat or gondola railroad cars, instead of being containers that are the size of a subdivision of a railroad car and that can be placed on trucks.

Containers of the "roll-off" type are in use between points in New England over the Boston and Maine Railroad. These are of steel and wood construction, 8 feet long, 7 feet wide and 6 feet high, carrying an average load of 3½ tons each, although merchandise may bring loads up to five or six tons to a container.

The units are equipped with double sliding doors with ball-bearing hangers, with sets of special casters to permit the containers to be rolled from trucks to platforms and from platforms to cars, and with locking devices to hold the containers safely on trucks and railroad flat cars. The trucks used in hauling the containers in the terminals are equipped with sub-frames and leveling blocks to lift or lower the containers to the exact levels of the platforms of railroad freight stations and of the shippers' and consignees' shipping and receiving places.

The ramp track method of handling containers is used in special cases in connection with demountable motor truck

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[7] See Pennsylvania Railroad Freight Tariff, G.O.-I.C.C. No. 14803, for details of the Pennsylvania Railroad regulations.

bodies which overhang the trucks and freight cars which carry the units. The containers are lifted from the trucks or cars by passing between two ramp tracks which are inclined upward. Rollers beneath the projecting sides of the containers make the lifting easier.

The Advantages Offered by Container Service

The unit container is of advantage to shippers, consignees and carriers. It may be used by shippers to avoid packing goods in cases or crates. This lessens the expense of packing and marking goods, and reduces gross shipping weights. The packing of goods in solid container lots makes more rapid movement possible by eliminating the necessity of handling less-than-carload consignments. The protection afforded by the solidly constructed, locked and sealed containers reduces loss and damage to the goods. The consolidation of a large number of small lots of freight into one or several large containers reduces terminal trucking expenses for both shippers and consignees, and the rates applied to container lots of goods often makes the total transportation charges lower than by ordinary less-than-carload freight service or by all highway motor haulage.

The container system enables the railroad companies to offer a fast, economical and coördinated motor and railroad service which can compete with independent motor freight lines, especially in medium and in long distance services. The amount of freight per car is greater in merchandise service, and idle car time and empty car mileage are reduced, thus increasing the performance of freight car equipment in a service in which, ordinarily, rolling stock is loaded to only a small fraction of capacity. Loss and damage claims are also reduced, pilferage is practically eliminated and the tracing of less-than-carload shipments is greatly facilitated.

Fig. 19.—Handling "Freightainers" on Station Platforms

Fig. 20.—"Freightainers" on Cars

Fig. 21.—Transferring "Freightainers" from Cars to Station Platforms

The use of containers reduces the amount of checking and handling of less-than-carload shipments at the stations of origin and destination, and eliminates all checking and handling at intermediate transfer stations. The direct car-to-truck and truck-to-car transfers at the terminals lessens congestion at the terminal stations since fewer vehicles are needed and transfers are made more quickly between the road and railroad vehicles. The service reduces the amount of freight station warehouse space required, and the railroads need less freight station space and handling equipment. The labor cost at stations is less, because a given amount of freight can be handled more cheaply in one large unit than in many small packages, provided there are adequate mechanical devices. Present-day wage levels are high and the use of man power to handle freight in small units is expensive. Large scale methods and mechanical labor savers are characteristic of modern industry. This principle applies to transportation, as well as to manufacturing and other phases of production and distribution.

The Interstate Commerce Commission has initiated an investigation into container car services and shipping practices. The first hearings were held in February, 1929.[8] The testimony presented in the hearings before the Interstate Commerce Commission was overwhelmingly in favor of the system. A number of witnesses expressed the hope that container car service would be extended more widely. A witness speaking for a group of 28 manufacturers stated that:

> The use of the containers permits our manufacturers to ship to points to which they cannot make straight carload shipments. The commodity of candy is not usually sold in carload lots. Orders from large jobbers do average from two to five tons or a manufacturer may pool shipments to certain cities where con-

[8] I.C.C. Docket No. 21723; and I. and S. 3198.

tainer service is in effect and serve several jobbers whose total orders may reach ten thousand pounds. Whenever we are unable to consolidate sufficent tonnage of candy to make up a carload (36,000 pounds) to cities served by containers, we use the container in lieu of full carload, and this has resulted in economy, not only to the shippers but to the consignee.

As we save nothing on the packing of shipments moving in containers (except that we do feel that it reduces claims to almost nil), if rates were advanced for this container service to the same level as class rates, we would not use the container service. The carrier, we feel, saves considerable money in the handling of containers, as compared with less-carload freight. We also believe that, if the container service is extended to all lines, it will favorably affect their terminal operation costs, as it is obvious there would be less handling of less-carload shipments at terminals, if containers were used.

We hope that the Commission will permit the continuance of the container service and that all carriers will be ordered to place it in effect.[9]

Other witnesses, although indorsing the service, have requested that the rates be readjusted downward, especially on long distance traffic so as to taper the distance scales on container car traffic in the same way that long distance rates are adjusted. Some shippers cannot take advantage of the service because they do not have enough freight to ship at one time to fill a container. Such shippers must use the services of forwarding companies in order to take advantage of container car service and rates.

The western railroads petitioned the Interstate Commerce Commission to suspend the container car tariff and service of the Missouri Pacific Railroad on the ground that the adoption of the service would injure the freight traffic of these railroads. They are called upon to haul a surplus of empty box cars. Some eastern carriers oppose the plan for the same reason.

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[9] Testimony of W. R. Moore, Traffic Manager, Eastern Confectioners' Traffic Bureau, before I.C.C., April 15, 1929.

If container car service is to be of maximum usefulness, it must be made available to small as well as large shippers and it must be available at a large number of stations at fair rates constructed upon scientific rate principles. These problems must be carefully worked out in order to avoid discrimination and to put the less-than-carload traffic of the carriers upon a sound economical basis.

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CHAPTER XI

TERMINAL CARTAGE SERVICE IN ENGLAND

In the United States the carriage of freight by railroad requires the hauling of large quantities of goods long distances, while in Great Britain there are few long hauls, and the traffic other than minerals consists mainly of small lots. The railways of Great Britain haul each ton of traffic an average distance of from 39 to 48 miles,[1] as compared with an average haul in the United States of about 181 miles, each railroad considered as a unit. The average loading per car in England varies from approximately 3 tons, for general merchandise freight, to 9½ tons of coal and mineral traffic, while the American average loading is less than 27 tons for all freight, about 51 tons for mineral freight, 28 tons for forest products, 12 tons for animals and animal products, 24 tons for agricultural products, and 26 tons for manufactures and miscellaneous traffic, an average of approximately 35 tons for all traffic. The average load of about 3½ tons per car for merchandise freight on the English railways, however, compares favorably with the low average loading of cars carrying less-than-carload freight in the United States.

The History of British Cartage

At the time the railways were being established in Great Britain the manufacturing industries had already been well started. A system of good roads and a demand for facilities of transportation to aid in the development of

[1] J. W. Roberts and H. E. Newcomet, Report, "Collection and Delivery (Cartage) Service of the Railways of Great Britain," July, 1925.

the manufacturing industries had led to the organization and growth of an extensive cartage service joining virtually all of the manufacturing centers, markets and ports of the country. The carters operated at that time in much the same way as common carrier motor companies function to-day. They collected freight at the doors of the shippers in one city or town, and made deliveries at the doors of the consignees in the same or other localities.

TABLE XIV

Revenue Tons of Freight per Loaded Car
United States, 1927

	Tons
Products of agriculture	24.0
Animals and products	11.9
Products of mines	51.3
Products of forests	28.3
Manufactures and miscellaneous	20.3
Grand Total, all carload traffic	35.6

These well-established cartage companies had secured a considerable amount of goodwill and were recognized by the courts as common carriers of goods that had assumed the usual common carriers' liability as general insurers of the goods hauled. Their usually reliable services were in demand by traders, and having the prestige of years of successful business existence the carters did not at once lose all of their traffic to the new rivals, the railroads. Because of the peculiar traffic conditions of the territory, the shortness of the many early railway lines, and the existence of the alternative cartage services, the operators of the early railways in England undertook to perform not only the rail haul but a complete transportation service of carrying freight from consignors to consignees as direct competitors of the carters. Cartage collection and delivery was established as an integral part of the railway service of virtually all English railways.

There were more than 120 railways in Great Britain prior to 1921 when they were consolidated into four systems: the London; Midland and Scottish; the London and North Eastern; the Great Western and the Southern. The performance of cartage of some sort or other was so taken for granted in England and was so much a part of railway service that a committee of railroad operating officers reported in 1925 that their oldest employees had no recollection of a time when the cartage services were not performed.[2]

Organization of the Service

The English railways collect goods from the consignor at his place of business and deliver them to the consignee. The cartage is performed either by the wagons, carts, drays, vans, or motors of the railways, or in certain instances, by the vehicles of independent companies employed by the railways as their agents.

Prior to the Railways Act of 1921 this collection and delivery was considered a part of the service to which shippers and consignees were entitled under the rates charged. Where the services were not used and either shipper or consignee or both performed the cartage services themselves a lower rate was charged. The Act of 1921 made some changes in the system of rates. The pertinent provisions of the Act were:

> On and after the appointed day a railway company may collect and deliver by road any merchandise which is to be or has been carried by railway and may make reasonable charges therefor in addition to the charges for carriage by railway, and shall publish in the rate book kept at the station where it undertakes the services of collection and delivery, the charges in force for the collection and delivery of merchandise ordinarily collected and delivered.

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2 Roberts and Newcomet, *op. cit.*, p. 5.

Any such company may, and upon being required to do so and upon payment of the proper charges shall, at any place where the company holds itself out to collect and deliver merchandise, perform the services of collection and delivery in respect of such merchandise as is for the time being ordinarily collected and delivered by the company at that place. Provided that the company shall not be required to make delivery to any person who is unwilling to enter into an agreement terminable by him on reasonable notice for the delivery by the company at the charge included in the rate book for the whole of his traffic, or the whole of his perishable freight, from the station at which those charges apply where any person does not so agree, the company shall not be required to deliver any of his merchandise, but if such person fails to take delivery of any merchandise within a reasonable time, the company may deliver such merchandise and make such reasonable charge therefor as it thinks fit.

Any dispute as to whether or not any charge for the services of collection and delivery is reasonable, or whether the length of notice for the termination of an agreement under this section is reasonable, shall be determined by the Rates Tribunal.[3]

The cartage services are rendered for the most part by the railways with their own vehicles and employees. Cartage by independent operators, acting as agents for the railways, is confined to the smaller or outlying stations and is in all respects, save ownership of the vehicles, similar to that performed by the railways directly. Where cartage agents are employed, they are strictly subject to the railway authority and the latter, not the agents, are responsible as general insurers of the goods handled. The carters are responsible, however, to the railways.

Each English railway has a complete cartage organization to supplement the rail service at the principal terminals of their respective lines. These organizations are under the management of specialists in this particular line of transportation work. Usually horse-drawn wagons or drays are

[3] Railways Act, 1921, Section 49.

used for shorter routes with frequent stops, while motor trucks are employed where more territory must be covered and fewer stops made per mile. There are, in addition, electrically propelled vehicles and a few steam-driven trucks, this latter type of vehicle being used for certain special types of traffic and for comparatively long runs with infrequent stops.

Inbound merchandise freight that is received at one of the terminals where cartage is performed by the railway and is consigned to a manufacturer or merchant within the cartage delivery area for that station is usually received at the freight house some time during the night. It is trucked by hand from the cars to the road vehicle which is to carry it to the store door of the consignee. Small shipments are segregated according to destination and placed in proper order in a road vehicle that will serve a particular territory. The goods are checked when unloaded from the railway cars or when loaded into the road vehicles. When the drivers of the horse drays or the attendants or carmen, as the motor truck chauffeurs are called, arrive at the freight stations in the morning, they find their vehicles loaded and ready to start. The contents of the vehicles, together with consignees' names, addresses and other identifying data, are noted on a consignment sheet which is given to the drivers or attendants. As deliveries of the goods are made to the consignees, the signatures of the consignees are obtained by the drivers as receipts for the goods. If the consignee is not available to sign for the goods the signature of a responsible agent is taken. Signatures are made in blank spaces provided for the purpose on the consignment sheets, these receipts constituting the carriers' evidence in case of dispute that the freight was actually delivered. In addition, the receipts indicate whether or not the drivers or attendants have properly performed their duties. If any freight is not

signed for in this manner, the driver or attendant must return the goods to the station, and there see that it is properly taken care of while awaiting successful delivery.

The carmen, in making their delivery rounds, collect freight shipped by the consignees to whom deliveries are made, and issue receipts for the freight picked up. At the freight stations the railway bills of lading are prepared and the freight is loaded on railway cars and dispatched during the late afternoon and evening of the same day it is received.

It is not the practice of all the railways of Great Britain to receive freight inbound at terminals only during the night and early morning, or outbound early in the afternoon or early evening. There is a continuous movement of loaded cars into and out of the freight stations at all hours.

Routes

The same carman usually delivers and collects. In order to do this with the greatest degree of efficiency, to promote the best of relations with shipper and consignees, and to speed up the service in general, carmen are assigned permanently to regular delivery routes which they cover daily. In this way they have an opportunity to make close personal contacts with the shippers and consignees on whom they call in the regular conduct of the railway's business, and the carmen are encouraged to develop the customer's goodwill. Personal contacts made in this way have been found to be beneficial to the railway companies, both in the conduct of the cartage services and in the amicable settlement of claims and disputes arising out of service failures.

The assignment of drivers permanently to fixed routes enables these men to acquaint themselves with the traffic requirements of the various shippers on their routes and to

arrange for additional facilities when needed. They are also able to make definite arrangements to handle prospective shipments. Orders for the pick-up or delivery of prospective freight may be given to the carmen by occasional shippers. Shippers who do not regularly use railway cartage are able to obtain service by sending word to the railway freight stations or by notifying the carmen of their respective territories. The latter plan is quite readily followed because the vehicles follow more or less the same schedule each day and the time at which the railway wagon or truck may be expected is usually well known.

The Peculiar Usefulness of the Cartage System to Great Britain

Cartage service, regularly offered in all parts of the territories served by the railways, has come to be looked upon by English traders as a necessary part of the rail service. The service is really made necessary by the small size of the railway cars employed, as the rapid dispatching of the freight through the terminals increases the amount of the freight that can be handled at the stations. It has often been suggested by laymen that the British railways adopt larger units of equipment, but railway officials point out that, while such a change might be desirable from an operating standpoint and would perhaps result in more economical train movement, it is impossible to change the English railway equipment standards without extensive changes in terminal and station layouts. Real property is exceptionally valuable in British cities and the present sites are already taxed to capacity to handle the traffic. To change to larger equipment and to alter terminals would result in such heavy capital expenditures that the operating economies to be gained might be offset by the increased investments required. No movement toward the abandonment of the present station sites and toward the

erection of new stations in outlying sections is discernible in England at present, although the cartage service would make such a change practicable.

The present terminal facilities make the continuance of the cartage service necessary. The volume of traffic passing through the freight terminals is so great that it would be virtually impossible for the railways to continue to perform their transportation services were the American system of shipper delivery and consignee collection of freight practiced.

The plan or layout of certain of the larger English freight stations makes organized cartage service a vital necessity. Some stations, particularly in the greater London district, have two floor levels, and the road vehicles must be conveyed in elevators to and from the levels above or below the street to be loaded or unloaded. In other instances the rail cars are raised or lowered by elevators to the street levels.

The facilities for handling of freight are quite different compared with American standard equipment. It is common practice, for example, to make use of horses in moving cars within the stations. At certain stations gasoline tractors are used in shunting service, while at other places cars are often shunted from track to track by use of ropes or cables and capstans turned by hydraulic power. This method of shunting is employed in many cases not only in making platform placements of cars but also in the actual making-up of trains for road movement. Turntables and electrically operated traversers are also used extensively. The travelers slide on rails connecting several sections of track and carry loaded or empty railway cars laterally from one track to the other.

The handicap of conditions such as these makes an organized cartage service a necessity to the railroads in order to expedite the movement of traffic through the ter-

minals. Without such services the resulting congestion would be disastrous to the efficiency of the whole railway system.

Organization, Volume of Traffic, and Equipment

The English railways have developed a very extensive cartage service requiring a large organization and much equipment. The magnitude of the undertaking is indicated by the volume of traffic handled and the equipment used to handle it. The four major railways operate more than 20,000 miles of line and transport about 400,000,000 long tons of goods traffic per year. The figures exclude live stock, which is reported in number of head and is not handled in cartage service. The aggregate total tonnage of merchandise freight handled in cartage service was approximately 27,862,091 tons or 33.9 per cent of the total merchandise freight traffic for the year in 1924. Allowing for possible errors in these figures and for annual variations in tonnage, it may be stated with reasonable accuracy that 30 per cent of all merchandise traffic handled by British railways is handled in the regular cartage delivery and collection service by the railways or their cartage agents. Other statistics indicate that for the sixteen-month period ending April, 1925, the railways handled in their own vehicles 27,048,639 tons of merchandise freight or an average of 1,691,158 tons monthly.[4]

English railways use some 18,000 horses, 32,000 horse-drawn wagons, and 2,000 motor trucks in the cartage service. There are also a relatively small number of steam-propelled vehicles, and some electrically propelled trucks. A large percentage of the wagons require the use of two horses, but while one wagon is on the road delivering freight, another vehicle is in process of being loaded or

[4] Roberts and Newcomet, *op. cit.*, p. 6.

Organization Chart
of the
Collection and Delivery Department
Great Western Railway
England

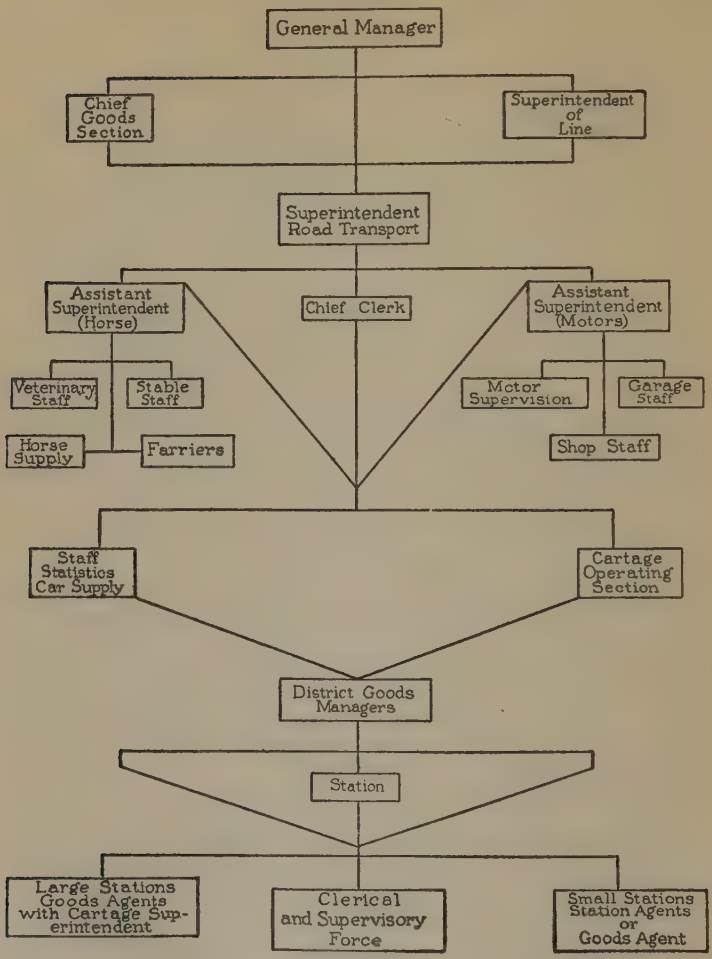

FIG. 22.

unloaded at the freight depot awaiting the return of driver and horses, hence there are 1.7 times as many wagons as horses. An adequate margin of extra vehicles is also kept to care for repairs and painting. The horses are assigned to certain drivers, but as a general rule the wagons are not specifically assigned. It is interesting to note that the horses used are standardized in two classes, one of 1,250 pounds and another of 1,650 pounds. Although the horses are well cared for, the average life in service is usually six years.

One man and a boy are usually assigned to each wagon or motor truck. The boys are often employed at the age of fourteen years and if they remain in service, succeed, eventually, to the position of driver or attendant. It is reported that relatively few employees in this service withdraw from it until they are disabled or reach the retirement age limit. Compensation varies with the position held but averages about $14.50 per week for drivers, $13.25 per week for attendants, and $8.75 per week for the boy helpers. A bonus is paid in addition to these regular wages for the handling of tonnage in excess of certain limits.

Traffic and Charges

The freight handled includes virtually all general merchandise in small lots. Small consignments and individual packages predominate, the average weight per consignment being 454 pounds and the average weight per package about 90 pounds.[5]

The cartage rates are published in the tariffs issued by the railways under the requirements of the Railway Act of 1921, and are usually included in the rail charges. An amount is quoted, to be deducted per hundredweight if

[5] Average for 121 goods stations, August, 1924.

the shipper delivers the freight to the station, and in the same way, the amount to be deducted if the consignee himself calls at the station for the freight and does not make use of the delivery service. If neither collection nor delivery service is used, the rate applying for collection at point of shipment and that applying for delivery at point of destination are added and the sum is deducted from the rate applying between the two rail points to determine the net rail rate without cartage services at either end.

Freight charges are usually collected at intervals from the shippers, all regular shippers having authorized credit accounts with the railways. Shippers or receivers who do not have credit arrangements pay the charges to the carmen, who are authorized to collect charges for the carriers. Freight not accepted when tendered is returned by the carmen to the freight sheds, and is delivered at a future time when it is desired by the consignee. An additional charge is made to cover storage and extra cartage service.

Since the Railways Act of 1921 and the advent of private motor road operators, there has been a considerable amount of discussion in England respecting the rates charged by the railways for performance of the cartage service. Conflicting arguments are made that the rates charged for cartage service should be below, equal to, or in excess of the actual cost of the performance of the service. The average cost of cartage was found to be $1.37 per ton for horse-drawn vehicles, $1.62 per ton for electric trucks, $.85 per ton for steam carriages, and $1.15 per ton for gasoline motor trucks.[6]

The advocates of the first plan contend that unless rates are lower than the actual cost of performing the service, shippers and receivers will be encouraged to perform their own cartage service, which if carried to any extent would

[6] Roberts and Newcomet, *op. cit.*, p. 24.

greatly increase the confusion and expense of handling the freight at stations, as well as reduce their capacity. The generally accepted view, however, favors fixing rates as near the cost of the service as possible, relying on the fact that such cost will be less than the amount for which the individuals can perform the services themselves.

Shippers and consignees compare their costs of trucking with the railway cartage rates to determine whether they can perform their own service for less than the railroads charge. However, the Railways Act of 1921 provides that shippers or consignees must perform all or none of their cartage services. This avoids the hazard to the carriers of shippers electing to handle the traffic that can be more conveniently carted while leaving to the railroad the burden of handling freight that is more costly and difficult to haul.

The Application of the British Cartage System to the United States

The cartage system as it is organized in Great Britain is adapted to conditions there, but before being adopted by the railroads in the United States there are several factors to be considered:

1. The cost of performing the service in the United States, due to higher labor costs, would undoubtedly exceed the cost in England.
2. The system as it exists in England is adapted to smaller units of railroad traffic than prevail in this country.
3. Shorter rail hauls in England than are customary in this country alter the situation to some extent.
4. The American railroads are not yet so consolidated as to avoid duplications of service and resultant expense.

Undoubtedly some form of organized cartage service must eventually be introduced in connection with the

American railroad transportation, particularly in the larger cities where congestion is already a serious consideration. There should not, however, be a duplication of the services by several lines in each place, but one service should care for each particular center, whether operated coöperatively by the railroads, or performed for them by one large trucking concern in each terminal, by a number of independent trucking companies working in harmony or by a single national terminal cartage company.

It is probably true that in a large number of the smaller cities and towns of the United States organized cartage service is not necessary and could only be given at this time at a loss. In these places the service should not be instituted unless arrangements can be made with local cartage companies or other agencies so that the trucks may be also used for other purposes than the hauling of freight to and from the freight depots. A system of delivery and collection properly coördinated with railroad freight service would, in the opinion of many transportation engineers and economists, make for economy in many forms of terminal service in the larger terminals.

Proper legislative action should be taken to encourage railroad coöperation in this country, just as the British Act of 1928 permits the railroad coördination and encourages the extension of railway motor freight services into all parts of Great Britain.

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CHAPTER XII

TERMINAL CARTAGE IN CANADA

In most of the important cities and larger towns of eastern Canada, a comprehensive cartage service is maintained which includes the haulage of merchandise or package freight between the warehouses of shippers and consignees and the freight stations. The service, which is provided for and governed by the carriers' tariffs, includes all merchandise or package freight, except that specifically excluded by the tariffs, both carload and less-than-carload. It is also automatically extended to all except the consignees who have notified the carriers' agents of their intention to do their own trucking. As soon as the freight comes in to the destination stations it is turned over to the truckmen. No arrival notices are sent to the consignees, the freight being delivered, as a rule, before such notices could be received. The shipments are billed to the destination stations, where the hauling companies obtain receipts from the consignees for the goods and collect the freight charges for the railroads. At each station a hauling superintendent attends to the freight as it arrives, and trucks are loaded directly from the freight cars, usually to capacity.

A shipper wishing outbound freight picked up telephones the central office of the hauling company in his city stating the amount of freight to be moved and the time at which it will be ready. The pick-up orders are consolidated by zones and one or more trucks sent to the several districts. Bills of lading, executed by the trucking companies as agents of the carriers, are tendered the shippers. Orders for trucks are usually accepted up to 3:00 P.M. each day

and all outbound loads are delivered to the rail stations before 5:00 P.M. Orders for cartage service received after 3:00 P.M. are filled the next day.

The Origin of the Service

The Canadian cartage system follows the plan that has always prevailed in Great Britain. The service was inaugurated about 1855, at the time the Grand Trunk Railway opened its line. The Canadian railways at first performed the service without charge and, in fact, until 1892, no charge was made for cartage, but, in 1893, increased costs led the railways to add to the line-haul rates 1¼ cents per 100 pounds for classes 1 to 4, and 1 cent per 100 pounds for fifth class rates (Canadian classification). In 1903 the charges were made the same for all five classes, 1½ cents per 100 pounds being charged for cartage. In 1908 the charge was increased to 2 cents per 100 pounds, with a minimum of 15 cents per shipment. At this time the railways were paying the cartage companies which actually performed the service at Montreal 2½ cents per 100 pounds. In 1912 the railways applied to the Board of Railway Commissioners for authority to raise the rates to 3 cents per 100 pounds, with a minimum of 20 cents per shipment. The evidence of the cartage companies showed that their costs of rendering the service had increased greatly; but the Board of Railway Commissioners did not grant the full increase requested. The railways were allowed to collect 2½ cents per 100 pounds, the minimum charge for shipment remaining unchanged at 15 cents per shipment.

The railways then contended that the increased cartage charge allowed them in 1912 did not adequately compensate them for the amounts they had to pay the cartage companies, and when the class tariffs to western Canadian points were reissued, following the Railway Board's decision in

the Regina Rate Case of 1912, the rates applying at those points did not include cartage, shippers and consignees being obliged to make arrangements for their own cartage. The railways arranged that when cartage service was rendered by certain designated cartage companies, charges on outbound shipments would be included in the bill to be collected from the consignees. The railways decided that on account of the bookkeeping expense it would be impossible to let all private carters participate in the arrangement. The consignees objected to the railways' billing forward the cartage charge for services performed at the points of shipment. It was claimed, by some consignees, that if cartage charges at the points of origin were expenses in connection with the sale of the goods they should be covered by the invoice prices of the goods. It was also argued that, while cartage service was a convenience, it was not a railway service under the terms of the Railway Act, the charges should, therefore, be arranged for separately.

The railways proposed to cancel all cartage tariffs effective October 1, 1913. They wished to terminate the contracts they had made with the cartage companies, and they stated that while in the past they had been absorbing part of the charge, the service was not a railway service, but one which had been given for the convenience of the public and to relieve the general transportation situation. However, negotiations were entered into which led to the continuation of the service on new rates and at the expense of the shippers.

The Board of Railway Commissioners held that cartage is not a railway service and that while the rates are quoted in the tariffs filed with the Board, it has no jurisdiction over the cartage companies or their rates. The railway companies may, of their own accord, arrange with cartage companies for the performance of the service, but the Board cannot compel them to do so.

Table XV indicates the changes in cartage rates between the years 1855 and 1913.

TABLE XV

CHARGES FOR CARTAGE SERVICE, CANADA

Railroads paid cartage companies 2½¢ per cwt.

Classes—Canadian Classification	1	2	3	4	5	
	Charges in cents per hundred pounds					
From 1855 to 1892	No charge					
From 1893 to 1903	1¼	1¼	1¼	1¼	1	
From 1903 to 1908	1½	1½	1½	1½	1½	
From 1908 to 1912	2	2	2	2	2	Minimum 15¢
From 1912 to 1913	2½	2½	2½	2½	2½	
From 1913 to date	Arrangement cancelled in western Canada. Varying charges in eastern Canadian cities, paid by shippers and consignees. Shown in addition to line rates on tariffs of the carriers.					

Present Service and Charges

The railway companies arrange with cartage companies to haul freight to the railway freight stations from business premises. With certain exceptions all package or merchandise freight that the railway lines collect is carted by these companies, which also deliver similar freight to the stores or warehouses of the consignees.

The agent of the Canadian Pacific Railway, for the majority of the large cities in eastern Canada, is the Dominion Transport Company; and for the Canadian National Railways the Shedden Company; although both companies employ several other contractors in the smaller cities. The contracts between the railway and cartage companies are private, not being subject to control by the Board of Railway Commissioners.

Whether the consignees shall or shall not pay cartage is a matter of contract between shippers and consignees. The

schedule of charges which the railway companies may collect for cartage service is included in the regular railway tariffs. The schedules of the Canadian Pacific and the Canadian National Railways respectively are shown in Tables XVI and XVII.

TABLE XVI

Cartage Charges Published by the Canadian National Railways

From Item No. 15, Canadian National Railways Tariff of Special Arrangements and Charges, C. N. Rys. Tariff No. C. R. 145, I.C.C. No. E. 269, C. R. C. No. E. 1205.

Station	Carloads, Cents per Hundred Pounds	Less Carloads, Cents per Hundred Pounds	Smalls Minimum Charge in Cents for Any One Consignment	
			300 Pounds and Under	Over 300 Pounds
Montreal, Quebec	5	7	30	40
Toronto, Don, Parkdale and West Toronto, Ontario	4	6	30	40
Guelph, London, Ottawa, Chatham and St. Thomas, Ontario; and St. Hyacinthe, Quebec	4	5	30	40
Windsor and Walkerville, Ontario.	3½	5½	35	50
Brantford, Hamilton and St. Catharines, Ontario.	3½	5	30	40
Sarnia, Ontario	3½	4	25	35
Valleyfield, Quebec	3½	4	25	25

TABLE XVII

Typical Cartage Charges Published by the Canadian Pacific Railway

Stations	Cartage Company	Cents per 100 pounds		Smalls Minimum Charges in Cents for Any One Consignment	
		C.L.	L.C.L.	300 Pounds and Under	Over 300 Pounds
Montreal Terminals * ...	Dominion Transport Co.	5	7	30	40
Toronto Terminals † ...	Dominion Transport Co.	4	6	30	40
Chatham, Ontario	Adam Taylor & Sons	4	5	30	40
Guelph, London, and Ottawa, Ontario	Dominion Transport Co.				
St. Hyacinthe, Quebec..					
St. Thomas, Ontario ...	St. Thomas Cartage Co.				
Three Rivers, Quebec ..	Dominion Transport Co.				
Bothwell, Ontario	A. R. Prout	3½	4	25	35
Glencoe, Ontario	W. McRae				
Thamesville, Ontario ...	J. B. Allard				
Tilbury, Ontario	McLeod Bros. Cartage Co.				
Hamilton, Ontario	Armstrong Cartage Co.	3½	5	30	40
Windsor, Ontario	Windsor Truck & Storage Co.	3½	5½	35	50

* Including Montreal, Atwater, Hochelaga, Mile End and St. Henri, Quebec.
† Including Toronto, North Toronto, Don, Parkdale, and West Toronto, Ontario.

Shippers and consignees not being compelled to have their cartage done by these railway agents may use their own teams or trucks, but on account of the efficient organization of the cartage companies for rendering this service expeditiously and economically, they do fully 80 per cent of the cartage as agents of the railways.[1] The same cartage company may deliver and collect freight.

The terminals are not used as storage warehouses to any great extent. Outbound freight is usually loaded into the cars direct from the trucks, and inbound freight, similarly, is taken from the cars and delivered to the respective consignees without going through the railway freight shed.

This system prevents congestion at the railway yards and prevents the streets leading to and from these yards from being crowded by the multitude of vehicles which would otherwise be engaged in this service. Due largely to the efficiency of the Canadian cartage system, the railway yards and the adjacent streets are quite orderly, even at seasons of the year and hours of the day when there is maximum business.

Cartage service is not provided in Canada west of Port Arthur or Fort William on Lake Superior, and the shippers or consignees must provide for their own transportation to or from the railway stations at places where cartage companies do not provide an organized service.

The Canadian Pacific Railway Company has arranged for cartage service from and to the stations listed in Table XVII. The rates for cartage are collected, as an addition to the freight charges, from consignees, or in the case of prepaid freight, from shippers, and include only the cost of carting between railway terminals and shippers' or consignees' places of business.[2]

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[1] Statement of Professor W. T. Jackman, University of Toronto, Toronto, Ontario.

[2] C. P. R. Tariff, E. 4050; C. R. C. No. E. 4126. I.C.C. No. E. 2295.

The charges shown in the foregoing tables (Tables XVI and XVII) are collected on first, second, third, fourth and fifth class freight as rated by the Canadian Freight Classification. As stated below, freight lower than fifth class, Canadian Classification, and freight that in other classifications is fifth class or higher but is lower than fifth class in the Canadian Classification, is carried at rail rates which do not include cartage. Cartage charges are collected on the basis of actual weight, subject to the minimum provided in the Canadian Freight Classification.

Freight Excluded from Cartage

The normal cartage charges shown in Tables XVI and XVII do not apply to the following sorts of freight:

1. Freight carried at rating lower than fifth class in the Canadian Freight Classification.
2. Freight carried under other classifications which may be classified therein fifth class or higher but which is lower than fifth class in the Canadian Classification.
3. Shipments weighing 2,000 pounds or more per piece or package.
4. Freight in bulk carloads, classified fifth class or higher in the Canadian Classification.
5. Freight for delivery to a private house.

The shipper or consignee makes his own arrangements with the cartage companies for the handling of these articles which include a fairly wide range of goods, such as acid in carboys or demijohns, agricultural implements, ash sifters, baby carriages, boats, brooders, caskets and coffins, charcoal, coke, cream separators, doors, window frames and screens, dynamos, eave troughing, empty containers, feathers, furniture and similar light but bulky and fragile goods.[3]

[3] See Item No. 15, Exceptions, C. N. Rys. Tariff No. C.R. 145, for complete list.

Freight included in these exceptions may be hauled at rates fixed by private contracts between the shippers or consignees and the cartage companies. Freight in carloads covered by any of the exceptions is subject to car demurrage rules as published by the railway companies in their tariffs.

The system of store-door service has many advocates among railroad men, shippers, consignees and transportation experts not only in Canada but in the United States. Professor W. T. Jackman of the University of Toronto, an eminent transportation authority in the Dominion, says of the Canadian cartage service:

"Store-door delivery or cartage service in Canada is the normal way of handling freight to or from the terminals and the system has so many advantages for all concerned that we are greatly surprised that it has not been adopted long ago in the United States. However, even business practices and methods have a habit of persistent tenacity."

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CHAPTER XIII

STORE-DOOR FREIGHT SERVICE

Store-door freight service has often been called the completed system of freight transportation. The various plans of coördinated terminal freight service now under consideration by the managements of United States railroads, electric railways, motor haulage companies, and steamship lines and by engineers, economists and shippers, contemplate the delivery of freight directly to the store door of the consignees immediately after the goods arrive at the receiving railroad stations. The vehicles that make the deliveries are also to be used to pick up outbound shipments and haul them to the freight depots of the railroads and electric railway or to the steamship docks.

Under the store-door service arrangement, the carriers in the terminal districts arrange with one or with a limited number of terminal haulage contractors, to perform the delivery and pick-up services as their agents. The carriers may elect to own and operate its own trucks, thus eliminating the use of outside and team operators. When the shipments arrived at destination in the terminal area, the goods are unloaded directly from the cars to the delivery vehicles and trucked to the consignee.

Store-door service has two fundamental objectives: first, quicker service to shippers and consignees without increased cost; and second, economy to the carriers in railroad freight equipment and labor. Advocates of store-door delivery believe both of these objects would be realized and the experience of England and Canada, with store-door delivery in actual operation, gives weight to this view. The success of the partial and modified systems of store-door

service in the United States, discussed in previous chapters, is also gratifying to its proponents.

Previous Experience with Store-Door Delivery in the United States

While door-to-door transportation service has been rendered by English and Canadian railroads for many years, this form of complete transportation has never been general in the United States. Store-door delivery service was first established in this country in 1867 by the Philadelphia, Baltimore and Washington Railroad in Baltimore, and was continued by the Pennsylvania Railroad when in 1881 it absorbed the Philadelphia, Baltimore and Washington. The Pennsylvania Railroad started the service in Washington in 1883, and in 1886 the Baltimore and Ohio Railroad established the service in Baltimore and in Washington simultaneously to compete with the Pennsylvania Railroad. Both railroads provided free delivery of less-than-carload freight from New England points, New York City and Philadelphia to the store doors in Baltimore and to substantially all of the city of Washington, and for the pick-up of goods at the store doors in Baltimore and Washington when destined to eastern points. Many goods were made exceptions and in general no service was given in connection with traffic to or from southern or western points.

This form of store-door service continued in operation for 44 years, but in 1911 a merchant in Washington complained to the Interstate Commerce Commission that the failure of the carriers to deliver shipments to him, while making delivery to a nearby competitor, constituted an unjust discrimination. The complaining merchant's place of business was located just north of the northern boundary of the free delivery zone, while his competitor's place of business was located on the same street just inside of the boundary line. The Interstate Commerce Commission held,

in Cassassa *versus* the Pennsylvania Railroad Company, that the defendant's refusal to deliver less-than-carload freight, free of charge, to merchants located on Fourteenth Street, Northwest, between Florida Avenue and Park Road, while it free delivered to merchants in other parts of Washington, resulted in unjust discrimination against complainant and other merchants on Fourteenth Street in the locality described. The railroad was ordered to cease its discrimination,[1] and the unjust discrimination was removed by extending the boundaries of the free delivery zone.

The extension of the zone of free delivery brought about by the Commission's decision in this case, led the Citizens Association of Anacostia, a section of Washington detached from the city proper by the Eastern Branch of the Potomac River, but connected by a bridge of about one-quarter of a mile in length, to file a complaint with the Commission in 1912 alleging that it was an unjust discrimination to end the free delivery zone at the city side of the bridge and not extend it to include the business community of Anacostia. The Commission found that the denial to the citizens of Anacostia, D. C., of free store-door pick-up and delivery of certain less-than-carload traffic, while such free service was extended to other sections of the city of Washington, was unjustly discriminatory insofar as the Pennsylvania Railroad was concerned, but not with respect to Baltimore and Ohio Railroad which maintained a freight station in Anacostia.[2]

The carriers, rather than submit to the further extension of zone limits, filed tariffs with the Interstate Commerce Commission, to become effective March 1, 1913, withdrawing the store-door delivery service in Washington. No action was taken, however, toward withdrawing the serv-

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[1] 24 I.C.C. 629, June 8, 1912.
[2] 25 I.C.C. 412, December 3, 1912.

ice at Baltimore. A storm of protest followed. The matter again came before the Interstate Commerce Commission, and a general investigation was made in the Washington Store-Door Delivery Case, decided in June, 1913. After ruling that the service must be continued by the carriers at Washington as long as it was in effect in Baltimore, the Commission states:

> It must be said in passing that the service as now rendered at both Washington and Baltimore presents features which, in the absence of further explanation, appear to be grossly discriminatory. For instance, the merchants of New York City or of Philadelphia may now ship certain property to Baltimore or to Washington and receive store-door delivery without extra expense. The merchants of Pittsburgh, Pa., Cleveland, Ohio, Buffalo, N. Y., or even Jersey City, N. J., or Wilmington, Del., however, when shipping like property to either Baltimore or Washington must pay rates which are substantially in line with those charged from New England, New York and Philadelphia and must in addition, pay or sell upon a basis that will enable their consignees to pay drayage charges at Baltimore or Washington.[3]

This decision hastened the inevitable, and both railroads filed tariffs withdrawing the service as of September 1, 1913. Protests were made to the Commission but the tariffs were allowed to take effect. In the cases of the Merchants' and Manufacturers' Associations of Baltimore *versus* the Baltimore and Ohio Railroad,[4] and in Judd and Detweiler, Inc. *versus* the Baltimore and Ohio Railroad, both of which were decided in May, 1914, in which Baltimore and Washington, respectively, were concerned, the Commission held that the railroads were warranted in discontinuing store-door delivery without changes in transportation rates. This put an end to the first phase of store-door service in the United States.

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[3] 27 I.C.C. 349, Decided June 17, 1913.
[4] 30 I.C.C. 389, Decided May 11, 1914.

The sluggish movement of freight in the terminals, the increasing congestion of city streets and the need for a more economical and efficient use of transportation equipment on the road and in the terminal areas during and following the World War again brought the question of store-door service prominently before the carriers and shippers of the United States.

The success of the service in England and Canada has led many students of transportation to the conclusion that a store-door freight service adapted to meet the needs of the carriers and shippers of this country will afford relief to terminal congestion and generally improve transportation service. A number of prominent railroad executives have declared their belief that store-door service offers a solution of the problem of congested railroad terminals. Many spokesmen of shippers and consignees, traffic organizations, chambers of commerce, transportation and traffic experts and other individuals and bodies of business men have gone on record as favoring store-door freight service as a means of increasing the efficiency of the national transportation facilities. They believe that organized collection and delivery service will eliminate the two worst evils of the existing system: first, the congesting of platforms at the freight houses caused by the holding of freight at the stations until the consignees have received the arrival notices and have made arrangements for the haulage of the goods to their places of business; and, second, the delay to the shippers' and consignees' vehicles at the platforms and adjacent streets resulting from the unorganized cartage methods and made worse by the fact that each wagon or truck is but partly loaded.

The prevailing practice of notifying the consignees of the arrival of less-than-carload freight after the freight has been unloaded into the freight houses is often wasteful of time, labor and equipment. Consignees are given an allow-

ance of 48 hours free time after the sending or giving of the notices within which to arrange for the unloading of carload freight from cars and for the removal of less-than-carload freight from the freight stations. Partly because of unorganized cartage methods and inadequate storage facilities, and partly because certain goods are sold after arrival at the terminals, a large proportion of the consignees take advantage of the full free time period, with the result that less-than-carload shipments are allowed to remain in the freight house an average period of three days.

A well-organized store-door service should make most of the freight house space available for use not less than twice a day, instead of once every three days, as it is under existing conditions. Under the present system of cartage the driveways at the terminal and the streets leading to it are burdened with motor trucks and horse-drawn wagons many of which are only partly loaded. Various studies have been made of the time consumed by vehicles at the freight stations, and many show delays ranging up to three hours. A special committee of the Atlantic States Shippers' Advisory Board, appointed to investigate the possibilities of store-door delivery, reported that rail terminals and facilities including freight houses and tracks at points within the Board's jurisdiction in most cases were constructed many years ago, and that many of these terminals and facilities have not been enlarged to accommodate increased traffic. In most instances the physical handling of freight has not improved to any great extent over methods adopted when the terminals and facilities were originally built.

The volume of traffic handled through terminals is constantly increasing and this increase in traffic, unaccompanied by enlarged terminals and improved methods of handling, has resulted in congestion during periods of business activity. This congestion has increased materially the cost to carriers and to shippers and consignees of handling

goods and has also reduced the efficiency of railroad car supply.

The committee stated its belief that a system of store-door freight service, efficiently conceived, organized and applied where freight terminals are inadequate, might reasonably be expected to result in a greater volume of merchandise handled through the terminals each working day, in the expediting of the movement of less-than-carload freight, and in an increased supply of cars.[5] The report found that increased flexibility at terminals, through handling of more merchandise and quicker movement of less-than-carload shipments of freight, and increased car supply would be the main benefits under a plan of store-door service.

The committee in its report further recommended that the cartage charges be just and reasonable, that the service be optional and that the rail carriers assume responsibility for the carriage of the goods in the terminals.

Mr. T. C. Powell, now President of the Chicago and Eastern Illinois Railway, stated in 1924, when he was Vice-President of the Erie Railroad, that the United States must eventually come to a system of store-door delivery. He expressed the view that if store-door service were established by the rail carriers to be used at the option of shippers or consignees, difficulties might be encountered in securing a large enough volume of traffic moving between the railroad freight stations and the store doors of shippers and consignees to make the service profitable.[6] A large percentage of the total cartage would be required to make the service attractive to the carriers, in the option of Mr. Powell, if the service were established on an optional plan with the carriers responsible for the goods.

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[5] Atlantic States Shippers' Advisory Board, *Proceedings*, September, 1924.

[6] *Proceedings* A.S.R.A. Board, 1924.

Mr. W. J. L. Banham, General Traffic Manager of the Otis Elevator Company and formerly General Chairman of the Atlantic States Advisory Board has endorsed store-door service on the ground that

> with hardly an exception, the main lines of railroads in the United States have sufficient capacity for the movement of all freight that can be offered to them. Generally speaking, rail transportation is restricted only by the complicated movements and delay of cars and freight within the terminal areas.
>
> The railroads must either enlarge or add to their present terminal facilities or find a way to pass more freight through them. The enlargement or multiplication of terminal stations and team tracks in important terminal areas is practically impossible because of the prohibitive cost and the objection of municipalities to the railroad holdings of real estate in territory deemed necessary for further industrial and commercial development. . . . A well organized system of store-door delivery would solve the problem.[7]

The special committee appointed by the President of the Chamber of Commerce of the United States composed of railroad officials, industrial and commercial traffic managers, officers of steamship companies, of drayage concerns, truck manufacturers and a newspaper editor, reported that "store-door delivery by motor truck would relieve congestion in the terminal areas and greatly increase the capacity of freight stations. It is undoubtedly the greatest contribution which can be made to the solution of the terminal problem."[8]

The late Robert C. Wright, General Traffic Manager of the Pennsylvania Railroad, stated in 1924 that the Pennsylvania Railroad was ready to invest money in erecting freight stations especially designed for motor truck service

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[7] "Can't We Carry Freight to Your Door?" *Nation's Business*, November, 1923.

[8] "Relation of Highways and Motor Transport to Other Transportation Agencies," Washington, 1923.

in connection with the terminal handling of freight "provided some organized system of motor haulage could be worked out along the lines of the store-door service systems of Canada and England." Mr. Wright stated that he was convinced that new railroad freight houses should be built in the outskirts of cities and the haulage of outgoing less-than-carload freight to these depots and the distribution of incoming less-than-carload freight should be done by motor trucks to the store doors of shippers and consignees.[9]

Mr. Elisha Lee, Vice-President of the Pennsylvania Railroad, has stated that "service of the character of store-door service is emerging from the purely theoretical stage, and many competent authorities believe that it has a promising future. The advantage of the plan lies in using both the trucks and the railroads for the portions of through service which they are best fitted to perform. The railroads can do the long distance hauling between terminals better than the trucks and the trucks can do the work between the shipper or the consignee, and freight terminal better than the railroads."[10]

Although store-door terminal freight service in connection with railroads, electric railways and steamship lines has many advocates it has not received the unanimous support of shippers, consignees and carriers. The mere fact that the service has not been introduced on a national basis in this country despite the wide attention it has received in the past ten years is proof that the problem is a difficult one.

Performing the Service

One of the first questions to be determined is whether the service should be performed by the line-haul carriers

[9] Address before Society Automotive Engineers, Detroit, January 23, 1924.

[10] "Commercial Motor Transport," New York *Sun*, July 11, 1922.

either directly or by their subsidiaries or agents, or by trucking companies acting as the agents of the shippers or consignees. The old plan of store-door delivery operated in Baltimore and Washington was performed by the carriers at their expense and the carriers assumed responsibility for the safe carriage of the goods to and from the railroad stations. This responsibility is also assumed by the rail carriers in England and Canada for the goods granted store-door pick-up and delivery service by the cartage companies which act as the agents of the rail lines. The cartage carriers are responsible to the rail lines and the latter in turn to the shippers and consignees.

There are wide differences of opinion among shippers and carriers in the United States as to the plan to be followed if store-door service is introduced in this country on an extensive scale. The spokesmen of a number of carriers have insisted that the service should be performed, if at all, by cartage companies acting as agents of the shippers and consignees. Several of the plans of terminal trucking services discussed in other chapters of this volume indicate this tendency. The rail carriers have established constructive or imaginary stations at ferry landings or other points where goods carried by trucks are considered to be received or delivered by the carriers in connection with outbound or inbound movements respectively. Here the responsibility of the carriers begins or ends, as the case may be, and the cartage companies begin or cease to function as the agents of the carriers. They function as the agents of shippers or consignees between the store doors of the users of the service and the railroad stations.

Spokesmen of shippers have consistently advanced the view that the service would be performed on the basis of the assumption of full responsibility and liability of the carriers from and to the store doors of shippers and consignees. The report of the committee on store-door delivery

of the Atlantic States Shippers' Regional Advisory Board, cited above, states the belief of the members of the committee that the assumption of full responsibility by the railroads is of fundamental importance to the success of the plan. In the countries where store-door service has been successfully operated, the carriers assume full responsibility for the truckmen in connection with the cartage service between the rail terminals and the places of business of shippers and consignees. The service, to afford the greatest amount of benefit to its users, must be an extension of the rail carriers' service. This cannot be done successfully unless the carriers assume full responsibility for the terminal cartage agents they select to perform the additional terminal services of pick-up and delivery.

If the selection of cartage agents were left to shippers and consignees in a comprehensive plan of store-door service and these agents were responsible to the patrons rather than to the carriers, one of the fundamental purposes of the system would tend to be defeated. Individual shippers and carriers would probably select cartage agents known by them to be responsible, and this would result in duplications of service. Shippers and consignees in one district would tend to select different cartage agents for one reason or another with the result that several terminal cartage companies would serve neighboring industrial and commercial establishments thus making the allocation of vehicles to certain districts impossible, unless there were mergers or divisions of territory by the cartage companies.

One of the strongest features of the English and Canadian terminal cartage system is the avoidance of duplicating and competing services in the districts served. The division of the territory into smaller pick-up and delivery districts or zones tends to reduce the number of vehicles in the congested districts and to increase the average load per vehicle between the terminals and the store doors, to

decrease the time required to make pick-ups and deliveries and to decrease the cost of handling goods.

Optional or Compulsory Service

The question whether the service should be performed by vehicles under the control of the carriers at the option of the shippers or consignees or should be applied to inbound and outbound shipments without consulting the shippers or consignees is another moot question. Former Interstate Commerce Commissioner Harlan in a report on store-door service to the Director General of Railroads during the period of Federal operation of railroads stated that it was urgently needed that all inbound freight should be taken away from steamship piers and railroad freight terminals as soon as the goods were unloaded from the cars. The report recommended a store-door delivery and pick-up service operated by the line carriers as a carrier service with extra drayage charges published in the carriers' tariffs.

Grave question as to the legality of the service is raised if the arrangement is applied to all freight of all shippers and consignees without giving them the option of hauling their own goods. In England and Canada the traders are given an opportunity, it will be recalled, to choose between having the carriers collect and deliver and doing their own cartage. If, however, the shipper and consignees elect to have the cartage agents of the carriers perform the service and give orders for this service to be performed for them by those agents, the service is performed without further orders on all shipments until notice is received that the shippers or consignees wish to make other permanent arrangements.

One of the most important economies of store-door service is lost if the service is not used by shippers and consignees on all shipments, except certain classes of traffic which can be handled better by them than by carriers'

cartage agents, *i.e.*, emergency shipments, or goods which the carriers are unable to handle. The number of vehicles at freight stations and the average load per vehicle will probably not be materially affected unless the service is used generally by shippers and consignees and to the maximum practicable extent.

On the other hand, the service must be advantageous to shippers and consignees as well as to the railroads and there must be flexibility sufficient to meet emergencies in order to make the service attractive to shippers and consignees. Legal obstacles may be avoided and the goodwill of shippers and consignees developed by making the service optional. There should be no valid objections on the part of shippers or consignees to an arrangement to apply the service without notice on each shipment after the shipper or consignee has expressed his wish that the service be accorded him.

Types of Freight to Be Included

Whether store-door service is applied to all shipments or the use of the arrangement is optional with shippers and consignees, it must be decided whether certain classes of freight are to be excluded or all freight, regardless of kind or type, is to be included. If exceptions are made what shall be the basis of the exclusions?

In both England and Canada certain classes of freight are exempted from the privilege of store-door delivery or pick-up service. Loose or bulk freight, articles of extraordinary size or weight, freight of unusual shape, dangerous articles, explosives and other special classes of goods are not handled in the ordinary course of business. Such articles are also commonly excluded from lighterage service by the tariffs of the carriers in this country, and, since store-door delivery has many points in common with lighterage, reasonable and non-discriminatory exclusions might

be made by the carriers of such goods from store-door service without unjust or unreasonable discrimination or undue prejudice to any shipper, consignee, locality or description of traffic.

Store-door service is applied to merchandise package freight. Articles of the types excluded in Canada and England, and those that are not given lighterage service in this country do not usually come within the category of merchandise freight.

Should Carload Freight Be Included in Cartage Service?

The question is frequently asked whether both less-than-carload and carload shipments should be given store-door service. Most plans discussed recently for the United States have considered only less-than-carload freight, although some advocates urge that carload lots be included.

Carload shipments forwarded from or consigned to private industrial tracks obviously do not require store-door service, for the railroad through rates include the movement of the cars from the industry tracks and the spotting of the inbound cars at the customary receiving points within the plants or on the industrial sidings. Freight from or to public team tracks may or may not be given store-door services. In some cases such service would probably be desirable; in others, it would not.

Less-than-carload freight to or from private industrial sidings is frequently handled in trap or ferry cars and the desirability of store-door service by motor would depend upon the policy of the carriers with respect to trap or ferry car service. It has often been attacked as wasteful of railroad freight car equipment because of the relatively light loading of trap or ferry cars in comparison with their capacity.

The service to and from store door is especially needed by shippers and consignees who have no private sidings and

who forward and receive goods in relatively small daily quantities. The cure for terminal congestion is the prompt removal of less-than-carload freight from down-town freight stations of the carriers and the quick clearance of outbound like shipments through the terminals, so that the stations may be cleared of freight twice a day rather than once in several days. The station platforms can be cleared more rapidly, and vehicular congestion can be materially reduced if store-door service is extended to less-than-carload freight. The extension of the service to freight now handled by trap and ferry cars and to carload shipments from or consigned to public team tracks may be made in the future, if that appears to be desirable.

Pick-up Service

It has been urged that store-door service should not, or need not, include pick-up service, but only the delivery of the freight from the railroad freight stations to the store doors of the consignees. Others urge that the system, to be most useful, should include both pick-up and delivery.

It is probably true that the expeditious removal of the inbound freight from the stations is more pressing than the acceleration of the clearance of outbound shipments. However, if freight is loaded at the stations into vehicles for delivery to consignees in various sections of the cities it would be inefficient to bring the vehicles back to the stations without return loads of outbound freight picked up at the business establishments where deliveries have been made or from other shippers in the same sections. One of the fundamental purposes of store-door service is to increase the amount of freight hauled per truck mile in the congested terminal, and this cannot be done effectively unless the same vehicles are loaded on both the inbound and outbound trips. A store-door service without a provision for picking up outbound shipments is only a half service.

The store-door plans in England and Canada provide pick-up as well as delivery. Mr. A. E. Beck, former Traffic Manager of the Merchants' and Manufacturers' Association of Baltimore, states that the lost motion which would result if the collection of freight were not included would seriously reduce profits, and he advocates a combination of pick-up and delivery services, industries and commercial organizations being allowed to use their own privately-owned or controlled teams and trucks to haul freight to the freight stations during at least a certain portion of the day. This allowance might be made, if necessary, but many believe that store-door service, if introduced in this country, will be successful only if it includes pick-up as well as delivery, and if vehicles owned or controlled by shippers or consignees are used as little as is consistent with economy and with the rights of these parties to control their own property.

Rates for Cartage

The charges for store-door service must be somewhat less than the cost of cartage by privately owned and operated vehicles, or the charges of independent cartage companies, if the service is to relieve terminal congestion. Heavier loaded trucks, concentrated pick-up and delivery zones, avoidance of cross routing of vehicles, the larger volume of traffic handled, and the operating economies incident to large scale methods should result in savings, which should be shared with the users of the service. If cartage costs are reduced in this way, private vehicles or those of agents of the shippers or consignees will probably not be used extensively, except in emergencies. The cartage charges in England and Canada, as stated previously, are an addition to the line-haul rates and are published as separate collection and delivery rates in the carrier's tariffs.

The plans for store-door service that have recently been

recommended have both line-haul and terminal cartage charges, both to be paid by the shipper or consignee, as the case may be. Store-door cartage charges should be sufficiently low to induce all shippers and consignees to use the service. They should be just and reasonable, reflecting properly the operating economies accruing to the railroads as a result of the establishment of the service. They should, however, take care of supervisory costs and provide a fair return upon the property used in the service. The rates should protect shippers and consignees from unjust and unreasonable discrimination between cities or localities and among shippers and consignees in the same city.

If zones are established within the terminals as a basis for cartage rates, great care should be exercised to adjust the rates so as to take care of differences in distance, as well as to preserve competitive relationships among shippers, consignees and carriers. The breakdown of the Baltimore and Washington plans of store-door service was due to unreasonable discriminations. The lessons of the past may profitably be taken as a guide for the future.

The report of the committee on store-door delivery of the Atlantic States Shippers' Advisory Board, to which previous reference has been made, states that trucking charges must be just and reasonable and that the cost of store-door service should be borne by the shippers and consignees. The cartage rates, in the judgment of this committee, should be in addition to the station to station railroad rates, and the carriers should not be expected to assume this expense.

Other spokesmen of shippers and consignees have expressed substantially the same view, and many have urged that the cartage rates and delivery zone boundaries in the terminals should be published by the carriers in their rate tariffs. The cartage rates should, they believe, be shown as separate factors to be added to the line-haul transporta-

tion charges. The carriers' tariffs should also publish the rates and regulations governing the service, and contain instructions to be given originating and delivering agents, and should set forth any special regulations affecting the carriers, drayage operating agents, shippers or consignees. Cartage charges so published tend to be stable, just as are the other special and terminal charges of the carriers.

The Establishment of the Service

There is a sharp clash of opinion as to the desirability of establishing a nation-wide store-door service at one time, or gradually at one terminal and then at others in response to local demands. Some persons advocate a country-wide store-door service established either by a national organization or by the railroad carriers acting in concert and contracting with only one or at most with several terminal cartage companies, or contracting with one cartage agent in each terminal or with several selected haulage companies in each city. The service, it is argued, should spring full grown from the heads of the sponsors of the lawmakers, and should be established simultaneously by all railroads of the country at every terminal where congestion makes the plan desirable. Other students of modern transportation problems urge that the service be established gradually at points where it is most urgently needed and, after the *modus operandi* is perfected, should be extended to include other terminals.

The committee of the Atlantic States Shippers' Advisory Board recommends that the service be established gradually. Any attempt to establish store-door delivery in a wholesale way will result in failure, in the opinion of this committee, which recommends that the service should be undertaken, "only at the points where there is an obvious need of increased terminal facilities for the handling of less-than-carload freight." The development of the service

should be gradual, and the report recommends that it should be established experimentally at certain smaller cities before being attempted in the larger terminals.

This recommendation is made upon the assumption that certain changes in the plan will be found to be desirable in the experimental stage. These changes may be made as the experiments are being worked, and the carriers will gradually develop the technique of this new method of handling freight, the lessons learned in the experimental periods being taken as guides for the establishment of the service more easily and effectively at the larger terminals.

The establishment of the service in this way has many advantages, and it can be accomplished without unreasonable discrimination during the experimental period.

A fair conclusion from the entire discussion seems to be that:

1. The use of store-door service should be optional with shippers and consignees, but the service should be made so attractive and the rates should be such as to encourage widespread participation.
2. The carriers should assume full responsibility for the carriage by their agents of the goods to and from the store doors of consignees and shippers.
3. Shippers and consignees should elect to use the service for all or none of their traffic.
4. The cost of store-door service should be borne by shippers and consignees, but economies in operation realized by the carriers should be reflected in reductions in cartage rates.
5. The trucking charges should be just and reasonable, and free from unjust discrimination and unreasonable prejudice.
6. The service should be established gradually.
7. The articles excluded from the service should be justly and reasonably selected without discrimination or preference among descriptions of traffic.

A store-door freight service based upon these principles is the most efficient means of improving terminal conditions, of reducing the cost of terminal operation, and of

lowering the total cost of transportation from the places of business of shippers in one city to the receiving platforms or store doors of consignees in other sections of the country.

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CHAPTER XIV

COÖRDINATED MOTOR-RAILROAD PASSENGER SERVICES

ALTHOUGH the carriage of passengers has never been the most important branch of railroad transportation service, the railroads of the United States enjoyed a large and steadily increasing volume of passenger traffic up to the years following the World War. The long-distance traffic between cities, and the excursion and commutation travel by railroad between cities and surrounding suburban towns, have dwindled steadily since 1920, with a corresponding decline in revenues earned. This loss of traffic is attributable to the automobile. The private passenger automobile and the motor common carrier bus have made rapid strides since 1920 in local and long-distance carriage services.

Increased expenses of operating branch lines, where traffic was already very light, accompanied by keen motor bus competition, have forced many of the railroads of the United States to reorganize their passenger transportation services in order to retain as large an amount of traffic as possible while reducing the expenses of branch lines by substituting motor bus services, operated through subsidiary companies or upon contract with motor companies.

The rapid increase of privately owned automobiles, the encouragement of motor transportation by the United States Railroad Administration, the rapid growth in the mileage of hard surfaced roads, improvements in design and construction of the passenger bus, the failure of state governments to act quickly and effectively in regulating independent bus transportation, the failure of the Federal Government to regulate interstate passenger traffic over the highways, and the attractiveness of motor bus transporta-

tion to the traveling public have all contributed to the situation in which the railroads find themselves with respect to passenger service. New methods of handling passenger traffic require railroads to add motor busses to the existing rail services either by the operation of busses directly, or by the organization of subsidiary motor companies, or by contracting with independent motor bus lines.

The railroads, in many instances, lacked the corporate authority to operate motor bus services directly, because of the limitations of their charters and franchises. Contracts with independent bus companies were impossible or impracticable in many cases, because the bus lines not being carriers subject to the jurisdiction of the Interstate Commerce Commission, the railroads were not permitted to establish through routes, to enter into schedule and rate agreements or to divide through joint rates with the motor carriers.[1]

These obstacles which required changes in charters and franchises by the state legislatures that had granted the corporate powers, and action by state commissions to hear and decide applications for the right of the railroads to operate bus service, contributed, in part at least, to the late entry of many railroads into bus transportation and caused a number of them to organize subsidiary companies to perform the service.

The investigation made by the Interstate Commerce Commission in 1926 and 1927 established the fact that more than 1,200 passenger busses were operated in connection with the railroads directly or by subsidiary companies, and nearly 20,000 busses were found to be in direct competition with railroad lines.[2]

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1 Section 6, Interstate Commerce Act.

2 Figures compiled from data submitted to I.C.C. in Motor Truck and Bus Investigation, 1926-1927.

TABLE XVIII

Passenger Traffic, Class I Steam Railroads

Figures compiled from Statistical Summary No. 7 of the Bureau of Railway Economics, Washington, D. C., and supplementary data supplied by the Bureau.

	1923	1924	1925	1926	1927
Passenger train miles	566,260,952	571,059,703	574,608,690	578,562,699	573,547,435
Passenger train-car miles ..	3,634,920,429	3,696,048,994	3,795,046,896	3,885,701,476	3,880,457,915
Revenue passenger miles ...	37,956,594,827	36,090,886,478	35,950,222,811	34,477,524,581	33,648,087,283
Passenger revenues	$1,145,698,579	$1,378,297,734	$1,360,427,159	$1,350,764,401	$974,893,366

TABLE XIX

MOTOR BUS SERVICE, CLASS I CARRIERS

1927

Region	Busses Operated in Connection with Railroad Service	Route Mileage	Busses Operated in Direct Competition with Railroad Service	Route Mileage
New England ..	21	84	453	8,599
Great Lakes ...	296	1,974	3,074	38,713
Central Eastern	68	243	4,656	38,396
Pocahontas	190	3,923	608	7,706
Southern	4	28	2,170	45,037
Northwestern ..	14	223	3,044	57,957
Central Western	659	4,950	3,827	106,708
Southwestern ..	1	15	1,267	31,406
All Regions TOTALS	1,253	11,400	19,099	334,522

These figures serve to indicate the progress made by railroad companies within a very few years in adding motor bus equipment and route mileage to their transportation services. The figures are incomplete as they do not include the bus services contracted for, nor the statistics for the smaller railroads, many of which are operating busses directly or through subsidiaries. Sixty-seven steam railroads operated busses in these ways in 1928.

The position has sometimes been taken that an exclusive right to serve justly belongs to the utilities—the steam railroads and electric railways—that have served a territory for many years and have expended large amounts of money in developing facilities. The representatives of established carriers have urged that they be protected against

the granting of certificates of public convenience and necessity by state public service commissions to bus lines which compete directly with the railroad services.

Motor manufacturers and independent passenger bus operators take issue with the position of the railroad managements that the transportation of the public rightfully belongs to the established utilities, and that competing motor services should be forbidden by the state commissions until the railways decide to employ motor vehicles. The motor interests object to this policy of permitting the sphere of usefulness of the motor vehicle to be determined by the railroads, a number of which have employed motor vehicles only as a means of conserving the rail carriers' investments and of combatting independent competition after motor operators have established their services.

The orders of public service commissions, the decisions of the courts, and the statutes of a number of states have tended to allow the free development of rival carriers where they do not directly impinge upon one another, but have protected the investments of existing companies if their services are, or can be made to be, reasonably adequate, and of benefit to the general public. The Public Service Commission of Pennsylvania in 1924 stated its position in the matter of protecting the interests of existing carriers and of the general public in the following terms:

> It has been the policy of this Commission to refuse to permit competition with existing utilities which have large investments and are necessary for the public convenience, if their service is or can be made reasonably adequate. No transportation agency can render perfect service at all times to all persons. The Commission must consider the benefit to the general public. The use of motor trucks for transporting property has reduced considerably the receipts of railroad and electric railway companies. Although such motor service may be more convenient to some shippers than service by electric railway or railroad, consideration of public convenience will not permit the Commission to

take action which will endanger the continued financial stability of such established roads.[3]

It must not be implied from the attitude of the commissions, courts and legislatures in seeking to protect the investments of existing transportation facilities that carriers by rail have the exclusive power to serve the public by some theory of divine right. The decision of the Pennsylvania Public Service Commission, quoted above, contains these highly significant words, "if their service is or can be made reasonably adequate." Standards in transportation like standards of living are progressive. What was reasonably adequate transportation in past years may be otherwise to-day. What was sufficient before motor transportation is not adequate to-day, as is demonstrated by the number of passengers who ride in motor passenger vehicles. The railroads and electric railways are not guaranteed immunity from competition by court and commission decisions if they fail to make their service adequate.

Typical Rail-Motor Coördinated Passenger Services

One of the most important examples of coördinated rail and motor passenger service is that offered by the New England Transportation Company, a subsidiary of the New York, New Haven and Hartford Railroad. The company was chartered in 1925. The New York, New Haven and Hartford Railroad Company owns all of the stock of the subsidiary, amounting to $1,877,000 par value.[4]

The first service was established by the subsidiary company in western Connecticut in August 1925, as a substitute for local rail passenger trains. Each successive installation of bus lines was made after surveys had been made

[3] *In re* Bingaman Motor Express Company, P. S. C. Pa., Docket A. 9092, February 19, 1924.

[4] Annual Report, New York, New Haven and Hartford Railroad Company, 1927.

to demonstrate the economies that would result from the substitution of motor for local rail service. About half of the bus routes have replaced local passenger train service, the other half being feeder lines or routes that supplement existing railroad services.

Where railroad service has been replaced by bus transportation, all of the services formerly performed by local passenger or mixed trains, including the carriage of baggage, mail, express and milk, have been taken over by the subsidiary company and handled by busses or trucks. The fares by motor are the same as those charged by the railroad for like services, including commutation, round trip and single trip fares.

The installation of routes and equipment has been slow. Traffic, operating and mechanical departments have been organized and expanded with the growth of business. In 1928 the company operated a maximum schedule of 58 routes, including 54 operated the year around and 4 during the summer months only. There were over 1,500 miles of route, and a fleet of 270 motor busses. In 1927 the bus mileage was 5,500,000, and 3,700,000 passengers were carried.

Few railroads have adopted coördinated bus and rail services for the purpose of earning substantial profits. The aims of the railroads are improvement of and economy of service, busses costing about 30 cents per mile to operate, while local passenger trains cost approximately $1.25 per mile.

The report of the New England Transportation Company shows that the operating expenses of bus service were 87.95 per cent of the total operating revenues in the fiscal year 1927.

The Boston and Maine Railroad Motor Passenger Service

Another outstanding coördinated motor-rail passenger service is that of the Boston and Maine Transportation

Company, a subsidiary of the Boston and Maine Railroad. It was started in 1924. The railroad company owns the busses and leases them to its subsidiary.

Bus transportation was especially important to the Boston and Maine Railroad as a means of reducing operating expenses, improving service and meeting independent motor competition. The railroad has only 1,372 miles of main line and has 854 miles of branch lines. There are 11 main line and 63 branch line divisions. Many of the branches were being operated at a loss and the cost of providing service on certain main line divisions in off-peak hours resulted in a poor return upon the property investment.

Motor service is used by the Boston and Maine in a number of distinct ways:

1. As a complete substitute for an-rail passenger service on unprofitable branch lines where passenger traffic is light.
2. As a partial substitute for branch line passenger train service.
3. As a partial substitute for main line service.
4. As a supplement to rail service.

Bus schedules are so adjusted on branch lines as to make motor connections with passenger trains at the junctions of the main and branch lines. Arrangements made with local express companies provide for the handling of baggage by motor and rail at through rates. The economies resulting from the complete substitution of busses for passenger train service are sometimes very great. On one division passenger train service which cost more than $2.00 per train mile was discontinued and busses at less than 30 cents per bus mile were substituted.

On a number of branch lines busses are used to connect with light trains during off-peak hours of the day or dur-

TABLE XX

New England Transportation Company
Combined Income Account

	Year 1927	Comparison with 1926, Increase or Decrease *
Operating Revenues		
Passenger	$2,029,755.43	$649,298.76
Other	188,360.69	108,429.50
Total	2,218,116.12	757,728.26
Operating Expenses		
Maintenance of way and structures	4,681.24	*331.73*
Maintenance of equipment	798,326.10	280,782.51
Transportation	862,975.64	166,269.97
Other	284,956.00	37,234.52
Total	1,950,938.98	483,955.27
Net operating revenue	267,177.14	273,772.99
Tax accruals	118,551.88	69,483.01
Operating income	148,625.26	204,289.98
Non-operating income	16,094.75	*7,709.93*
Gross income	164,720.01	196,580.05
Deductions from gross income	109,727.47	64,372.74
Net Income	$ 54,992.54	$132,207.31

* Decreases in italics.

The Operating Expenses were 87.95 per cent of the Total Operating Revenues.

The N. Y., N. H. & H. R. R. Co. owns the entire issue of capital stock and its investment in this Company is as follows:

	Par Value	Book Value
Stock	$1,500,000.00	$1,500,000.00
Notes	377,000.00	377,000.00
Total		$1,877,000.00

ing seasons of light traffic, while main line trains are used during periods of heavy traffic. Branch line trains, in such cases, are used to handle mail, express matter and baggage, leaving the busses free to accommodate passengers only.

The Boston and Maine Railroad has reduced the running time of its main passenger trains between important stations by increasing the speed of the trains and reducing the number of station stops. Many smaller stations were discontinued as train stops and busses were provided to carry passengers from the stations at which the main line express trains stopped to the smaller intervening stations. Busses are also used to replace certain trains on main lines at periods of the day or during seasons of the year when traffic is light, trains being run during the peak hours and seasons.

To augment the rail passenger service busses are operated by the Boston and Maine Transportation Company on feeder routes to sections not served directly by the railroad. An interesting experiment in supplementary service is that between Boston and Portland, numbered bus seats being sold just as are Pullman seats.

The Boston and Maine Transportation Company, in 1928, operated 112 busses, including 92 owned by the company and 20 leased for the heavy summer traffic, the bus mileage being two million miles. In 1927 the bus miles were 1,719,-763, the bus routes were 29 and the routes were 1,400 miles in length. The average cost of operation ranges between 29 and 29½ cents per bus mile.

Other Coördinated Rail-Bus Services

It is not the purpose of this volume to discuss the coordinated service plans of the large number of steam railroads that have made arrangements to integrate steam railroad and motor bus passenger services. The Pennsylvania Railroad and Mitten Management coördination in eastern

Pennsylvania, New Jersey, New York, Delaware and Maryland is an unusually important and significant development of the early part of 1929. This service brings in close contact the services of electric railway, motor bus, taxicab and railroad passenger transportation services.

It is not improbable that further developments in the coördination of railroad and motor bus services will make long distance rail-motor passenger service arrangements available at through rates and joint routes, similar in general plan to the coördinated rail and airplane routes now operated in the long distance passenger service.

TABLE XXI

BOSTON AND MAINE TRANSPORTATION COMPANY

BUS OPERATING COSTS

Operating Expenses	Annual	Per Bus Mile
Maintenance of way and structures including removal of ice and snow	$ 1,490.55	$.0009
Maintenance of equipment	108,948.77	.0633
Gasoline	43,986.29	.0256
Total transportation expenses including wages and superintendence	164,295.27	.0955
Total traffic expenses including superintendence, solicitation and advertising	24,187.94	.0141
Total general and miscellaneous expenses	142,946.34	.0831
Total operating expenses	485,854.56	.2824
Tax accruals	19,468.10	.0113
		$.02937

Motor Passenger Busses in Terminal Service

Although the principal use of busses in coördinated service has been for branch and main-line substitution, and for feeder and supplementary services, there are instances of rail-and-motor coördination in terminal districts. The Baltimore and Ohio Railroad uses motor busses to connect its passenger trains in Jersey City with Manhattan, Brooklyn and Newark. During the period of Federal control of railroads and for several years thereafter the Baltimore and Ohio trains between New York and the West and South used the Pennsylvania Railroad Station in the heart of the uptown business district at Seventh Avenue and Thirty-second Street instead of the Central Railroad of New Jersey's depot across the river in Jersey City. During the period of tenancy, the Baltimore and Ohio Railroad built up a considerable volume of through passenger traffic which it desired to retain after the expiration of the lease with the Pennsylvania Railroad. Bus routes between Jersey City and the centers of the business and commercial districts of New York, Newark and Brooklyn were established August 29, 1926, when the Baltimore and Ohio trains ceased to use the Pennsylvania Terminal. The busses meet all incoming trains at the train shed in Jersey City and take passengers, without extra charge, directly to the centers of New York, Newark and Brooklyn. Passengers from these cities may reach Baltimore and Ohio Railroad trains by busses that leave central locations on schedule and are guaranteed to make connections with the trains. Runways and turntables have been constructed to enable the busses to receive and discharge passengers at the platform alongside the trains in the train shed. Accommodations are provided for the traveler's baggage.

The installation of this unique motor bus terminal service has enabled the Baltimore and Ohio to neutralize the

handicap of not having a passenger terminal in the heart of New York, if not to change the handicap into a positive advantage. Arrangements have been made with the Philadelphia Rapid Transit Company in Philadelphia for busses to be used to convey through passengers between the Baltimore and Ohio Railroad passenger terminal at Twenty-fourth and Chestnut streets and the ferry stations on the Delaware River, where trains leave via the Pennsylvania and Reading lines for New Jersey seashore points.

It is hoped that this service will stimulate through travel between seashore points and stations on the Baltimore and Ohio Railroad by eliminating the necessity of the use of taxicabs or street cars through the city.

The Motor Transport Division of the American Railway Association

On January 1, 1929, 67 steam railroads operated 1,250 motor busses in regular common carrier passenger service. The Motor Transport Division of the American Railway Association was organized in 1927 and has greatly promoted the developments of motor-rail transportation. The Motor Transport Division acts as a clearing house for the exchange of experiences of railroads in operating motor bus service, so that rail carriers contemplating the establishment of such a service may have the experience of roads already engaged in similar operations. Operating problems in the field of motor service need no longer be approached more or less blindly by the railroads. The solution of operating problems connected with the use of automotive equipment may be had from other carriers through the Motor Transport Division.

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CHAPTER XV

MOTOR RAIL-CARS

EXPERIMENTS seeking a lightweight single car or car-and-trailer train for use in railroad service where traffic is light and revenues correspondingly small have been conducted in the United States and in Europe for more than eighty years. In 1847, the first light steamer rail-car was invented but its use was abandoned after several trial trips. In 1879 rail-cars propelled by compressed air were used in the Second Avenue Railroad in New York City, and in 1885 storage battery electric rail-cars were experimented with by the railways of France. These electric cars were not successful because of the great weight of the storage battery units necessary to develop the amount of power required. In 1901 and 1902 trials were made with the McKean rail-cars and the French-Westinghouse gas-electric cars which did not make great headway on account of the difficulties encountered in developing light engines of more than 135 horse power, the minimum power required to overcome wind resistance. Automobile chassis modified with railway coach bodies mounted on flanged steel wheels to run on railroad tracks were designed but the models which resulted from these experiments were crude and unsatisfactory. A number of railroads used motor rail-cars of one type or other for inspection service, and a few roads, including the Ann Arbor Railway in Michigan, used equipment of the motor rail-car type in passenger service for several years before the beginning of the World War.

The loss of a large amount of passenger and light freight traffic following the World War forced the railroad companies operating branch lines to seek facilities more eco-

nomical than steam trains for branch line passenger, light freight, express, and mail services. The expense of operating branch line trains increased while passenger revenues declined due to private and public motor vehicle competition. Service often could not be abandoned by the railroads even though the operation of the branches resulted in loss. Passenger, freight, express and mail services often had to be continued, not only because of franchise or contract obligations and orders of public regulating bodies, but also because of the desire of the railroad management to continue to offer the services to the patrons located on local branches.

The motor rail-cars of various types, including the gasoline motored Diesel-electric and gasoline-electric cars, offered one solution of the problem. Steam railroad train operating costs range from an average low cost of 75 cents per mile to an average high cost of $1.50 per mile, with 90 cents as a fair typical medium. Motor rail-cars are operated at a low average cost of 25 cents per mile to an average high cost of 45 cents with 35 cents as typical. Rail-cars are constructed to seat from 25 to 30 passengers with space for baggage, light freight, express or mail traffic, up to 86 passengers. There are two-car rail-motor trains with space divided between passenger accommodations, and compartments for light freight, express and mail as the requirements of the service dictate.

The manufacturers of the railway equipment, particularly the J. G. Brill Company, the Westinghouse Electric and Manufacturing Company, the General Electric Company, the Ottawa Car and Manufacturing Company and the Edwards Railway Motor Car Company, have made rapid strides since 1920 in developing gasoline, gasoline-electric and Diesel-electric rail-cars to meet the requirements of the railroads for reliable, attractive, substantial, lightweight cars which may be operated and maintained at low costs per mile. The public insists that rail-cars must be comfortable

and easy riding. The rapid increase since 1922 in the number of orders for rail-cars and trailers indicates how well the manufacturers have met the requirements of the carriers and of the public, and how fully the rail-cars of various types have served their purpose.

TABLE XXII

RAILROAD MOTOR RAIL-CAR EQUIPMENT

Years	Orders for Rail-Cars of All Types (*power units*)	Trailer Cars
1922	51	9
1923	77	9
1924	120	20
1925	149	19
1926	142	17
1927	181	25
TOTAL, 6 years	720	99
TOTAL all rail-car equipment, including trailers	819	

Motor rail-cars and trailers equipped with 4 or 6 wheel trucks front and rear are satisfactorily meeting the requirements of the railroads in all parts of the United States. More than two hundred railroads are now using some type of rail-car equipment.

Development in Equipment

Prior to 1922, motor rail-cars were usually relatively small, 60 feet or less in length, of less than 200 horse power, and under 100,000 pounds in weight. There has been a steady increase in size, horse power and weight, until some cars are 73 feet in length and develop 400 to 500 horse power. Most cars now being built weigh more than 100,000 pounds each. The figures below show the tendency in these directions.

TABLE XXIII

RAIL-CAR SPECIFICATIONS AS INDICATED BY ORDERS PLACED FOR EQUIPMENT

Horse Power	1927	1926	1925
200-250	43	65	36
300-400	16	10	2
400-500	5	0	0
Weights			
75,000-100,000 pounds	29	79	27
100,000 and over	103	38	9

The gasoline motor rail-car was the type most extensively used up to 1925. Since that year, however, the gasoline type of car has lost ground to the gas-electric car which has become the leader in number ordered each year, but the gasoline rail-car is still extensively used.

The gasoline motor rail-car used by the Chicago, Burlington and Quincy Railroad affords an excellent example of the latest model of this type in general use. A typical car weighs 71,000 pounds, with 70 per cent of its weight in trucks. Each is equipped with a 100 horse power six-cylinder motor. The cars can be operated independently or as train unit and are capable of maintaining a speed of 45 miles per hour. The radiators are placed on the roof of the cars in order to obtain the full benefit of the wind for cooling the motors, while the motors are mounted on the trucks, thus leaving the entire space of the car except the operator's cabin on the right front corner, to be used for carrying purposes.

The Diesel-electric rail-car is comparatively little used in the United States because of the excessive weight of the engine per horse power developed, the weight being about 70 pounds per horse power developed, while the gas-elec-

tric engine used in motor rail-cars has a corresponding weight of but 15 pounds. The weight of Diesel engines is being reduced and the economy of operation makes their future use probable. Diesel-electric cars have been successfully operated at the low rate of 28.2 cents per mile.

The Canadian National Railways have obtained very satisfactory results with Diesel-electric rail-cars, which have been operated 100,000 miles without requiring a general overhauling. They have proved their ability to travel through deep snow, and to perform heavy service on a 3.25 per cent grade in coal switching work.

The most popular type of rail-car in use at present is the gas-electric, due to the long life of power plants, the reliability of the motor in heavy duty service, the greater power per unit of weight, the simplicity of control, automatic gear shifting, and the fact that the car can be operated from either end. Nearly all of the rail-car orders in 1927 were for gas-electric types.

The Sphere of the Rail-Car

The rail-car has the greatest possibilities of usefulness upon railroads where regular, frequent service is needed to meet the requirements of communities on branch or main lines for the transportation of passengers, light freight, baggage, express and mail and where each kind of traffic is too light to justify the operation of steam trains and too heavy to be handled by motor coaches and trucks.

This condition is found on branch lines or between main line stations where traffic is light, but where regular and frequent service is necessary. Rail-cars are also used to connect towns located a short distance apart in the main line and on branches. Some suburban railroad divisions can be adequately served entirely by rail-cars, while some branches and some main line sections can best handle the traffic by operating steam railroad trains during the hours

Fig. 23.—Types of Motor Rail-Cars

of peak traffic and rail-cars in the off-peak hours. Summer resorts and other districts where frequent service for a relatively small number of passengers is required are well served by motor rail-cars. Milk transportation from small shipping curbs can be done more economically, in many cases, by rail-cars than by steam trains. Rail-cars are sometimes used in light switching service and for hauling the special cars used for carrying employees of railroads or factories to and from their homes. In general motor rail-cars are profitably substituted for railroad trains on runs where state or Federal laws require the continuance of passenger and other services and where a frequent movement must be given light traffic, and to meet motor truck and bus competition. In some instances state laws prescribe minimum train crews, and make the expense of operation prohibitive as compared with the cost of running motor rail-cars.

The rail-car has certain advantages over motor busses as a substitute for railroad service. It can handle light freight, baggage, mail and express along with passengers better than can the motor busses. Railroad coaches can be remodeled into rail-car equipment, and the train personnel can be used to operate rail-cars, thus avoiding the necessity of building a new motor staff. No special certificates of public convenience to operate rail-car service need be obtained of state commissions, while such certificates are a prerequisite for a motor bus or truck route.

The motor bus, on the other hand, is superior to the rail-car as regards wage costs and flexibility of operation. H. F. Fritch, Passenger Traffic Manager of the Boston and Maine Railroad, and President of the Boston and Maine Transportation Company, states that on one of the branch lines of the Boston and Maine service was increased by the installation of motor rail-car operation after experimentation with motor bus service. Train service was first

reduced and supplemented by using motor busses, which increased the total number of service trips per day, then when rail-cars became available it was found that they could be substituted for all train and motor services on the branch line in question.[1]

Whether steam, motor or rail-car service is the best and most economical is not a matter of generalization but one of particularization. A thorough analysis must be made of the traffic to be handled and of the costs of rendering the required services by each facility of transportation. The passengers to be carried, the necessary frequency of schedule, the volume of light freight, mail, baggage, newspapers, express matter, milk, and other goods to be handled, the time at which goods must be carried to meat markets or carrier connections, the necessity of operating trains to carry peak load passenger or haul carload freight, the utilization of available labor to man cars, trains or motor-highway equipment, the experience of the employees, and the need of greater flexibility to serve territory not reached by the rails, all the factors must be studied in deciding which will be the most effective facility to adopt.

In studying any particular case, the possibility of redistributing traffic among other services must first be gone over carefully. It is sometimes possible to rearrange traffic, both passenger and freight, that rail-cars or motor busses and trucks can be substituted for trains where such a change seemed impossible. Newspapers, express matter and milk are commodities which can sometimes be carried more readily by rail-car than by motor bus and with better service to the public. Ordinarily it is difficult to handle goods traffic other than first class mail matter, baggage or newspapers by motor busses. Trucks are needed to supplement the busses.

[1] H. F. Fritch, "Rail Car or Motor Coach," paper, Transportation Meeting, Society of Automotive Engineers, Chicago, October 26, 1927.

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CHAPTER XVI

COÖRDINATED MOTOR-ELECTRIC RAILWAY SERVICES

At the time when most of the electric railways in the United States were built, highways were local in character and were considered relatively unimportant by the communities served by the electric lines. Horse and wagon transportation was slow, and its radius was short, but with the coming of the automobile conditions were radically changed for the electric railway. The horse and wagon and the unsurfaced local or county roads were displaced by the motor car, the freight truck, the passenger motor bus, and the improved highways. The electric railway was confronted with the competition of the private automobile and motor vehicles which were used as conveyances for hire upon occasions. Thousands of small car owners rode to work in their cars, picking up friends and others on the way and charging a fare of their informal passengers. Thus originated the "jitney," the scourge of the electric railway passenger business.

The jitney business was believed by the uninformed to be profitable because no accurate accounts were kept, and interest and depreciation charges were not seriously considered by the average operator. Many men decided to follow this vocation of jitneying as a regular business and jitney busses were to be found in every town and city of the United States. These motor operators, as a rule, followed no regular routes, ran on no schedules, and were often not financially able to assume liability for the safety of their passengers or for the property of others. They did, however, succeed in making serious inroads upon the revenues of the electric railways operating local service in

certain cities and suburbs. The jitney is stated by electric railway operators to have been the proximate cause of many traction company receiverships. The regulation, and in most cases, suppression, of the jitneys (which generally came to be considered a nuisance) by municipal ordinances and state laws relieved the situation. In the place of the jitney came the regularly constituted common carrier motor bus line, the second competitor of the railway.

Passenger Bus Services

In the beginning, lines were operated with only the most superficial public regulation. Competition of busses and trucks among themselves and with the electric lines was not usually restricted. Rates and fares were fixed at any figure that would bring business. Few of the operators kept sufficiently accurate or complete accounts to be able to determine whether or not they were operating at a profit or were even meeting fixed and operating expenses. Many motor truck and bus lines existed less than a year. Manufacturers were selling busses and trucks on relatively small cash payments and granting extended credit terms to present and prospective operators. Finance companies assisted in bringing motor vehicles within the reach of small operators. Although failures were common and the turnover rapid, bus and truck competition continued to grow.

The urban railway companies, especially those in the smaller cities, whose revenues depended almost wholly on the passenger business, were seriously affected. Many interurban lines likewise depended for their revenues on local passenger business. The competition of private motor cars and trucks and of carrier busses and trucks compelled a change in the operating policies of many electric railway lines. Some of the electric lines carried express freight as well as passengers and others took on this service to add to their depleted revenues. For the express traffic, the

competition of the motor truck was hard to meet, because the truck operators gave a pick-up and store-door delivery service that the railways could not give without joining railway with truck transportation. The electric railways, in considerable numbers, acquired motor trucks and busses and provided a coördinated transportation service. One large electric railway system, in announcing its plans, defined coördinated service as the avoidance of duplication. "Not the operation of a car and a bus where a car or a bus would do, not the operation of a car when the operation of a bus would be more efficient and cost less, not an overplus of service in one locality and a dearth in another, but the operation of busses and cars jointly so that each will be run in sufficient number to meet demand, and in a way that will give maximum of service at a minimum of cost."[1]

In a few cases the electric railways completely replaced certain lines of branches with motor services and became motor truck and bus operators on a large scale, with the railways as minor parts of their business, while a few companies have entirely abandoned their railway lines for busses and trucks. Usually the motor service is operated as a supplement and complement of the electric railway line.

Motor-Electric Railway Passenger Services

Electric railways have made much more extensive use of highway transportation in the passenger than in the freight service. This is due, in part, to the fact that the electric lines engaging solely in carrying passengers greatly outnumber those that conduct both freight and passenger services, but it also results from a demand in many localities for both motor bus and electric rail service along

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[1] Harlow, C. Clark, "Coördinated Transportation Service," address before the New Jersey Utilities Association, 1923.

parallel routes. Electric railways and motor busses are often used as substitutes for, or as supplements to each other.

One of the first and most important uses of the motor bus is as extension and feeder lines in city service. The managements of urban electric railways are often confronted with demands for extensions into new suburban developments, to outlying manufacturing plants, and to other new districts not served by street railways. Such railway extensions seldom, if ever, pay operating expenses for many years, to say nothing of the fixed charges on the additional investment. Overexpansion, through compliance with demands for extensions, has contributed to the financial difficulties of many city railways.

Extensions, however, can be made at small capital outlay through the establishment of motor bus lines. The bus can be used to gather in enough traffic to make existing outlying routes profitable. If the expense of operating the bus service on such routes is found to be too great for the amount of traffic developed, the service can be withdrawn with small capital loss. The operation of the busses and the establishment of regular service hasten the growth of traffic and the time when a track extension will pay for itself.

Another important use of the bus in extension work is in short connecting and cross-town lines. Service of this type in certain locations in many cities adds to the convenience of the whole electric railway system and helps to promote goodwill, although there is not sufficient traffic to justify the laying of tracks to connect the main lines of the railways.

Several distinct systems are followed in fixing the rates of fare for auxiliary or feeder bus service. Some urban railway companies provide for free transfers between the city railway lines and the bus routes. The same rate of

fare is charged on the busses and on the street cars. Among those following this fare plan are the Milwaukee Electric Railway and Light Company and the Wisconsin Gas and Electric Company in Kenosha, Wisconsin. Indeed this system is generally used for short extensions and for the connecting and cross-town lines.

Other railway companies charge a higher rate of fare on the busses, with the passenger given the privilege of obtaining exchange from bus to car, and an exchange from car to bus by bringing the fare up to the bus level. This is the plan followed by the Philadelphia Rapid Transit Company and the Los Angeles Bus Company, which is the Pacific Electric Company's motor bus subsidiary.

Still other companies use the new service as an opportunity to introduce zone fares. This is done by charging an extra fare on the bus without transfer or exchange privilege to or from the street car lines.

A number of electric railways have had to solve the problem of competing with an independent motor bus line operating over a parallel route, and many companies, notably the Public Service Railway of New Jersey, have purchased the independent bus lines and correlated the services of the busses and electric cars. Before the electric railways took over these lines, busses were operated just ahead of the street cars and on practically the same headways, the busses thus taking a large share of the prospective street railway passengers. Now the headways are "staggered," that is cars are alternated with busses, and the actual headway is half that of either cars or busses operated singly. The result is better service and lower operating expenses. The Public Service Railway is now operating more than 1,200 passenger busses in parallel and feeder services. It has a greater number of passenger busses than any other electric railway, and is also the largest operator of motor busses in the United States.

An interesting parallel service is that of an electric railway in New England which operates street cars on an exceptionally long route over a very congested highway. Delays of the cars by local traffic and the number of local cars in towns on the route taxed the track capacity of the road. The problem was satisfactorily solved by operating all electric cars over this route in express service. Local service was maintained by using motor busses. Both local and through operations have been speeded up by this plan and street congestion has been materially reduced.

A service that is possible for the bus but impractical for the street car, is the *de luxe* or guaranteed "seat-per-passenger" service. Passengers are assured seats and high-grade, palatial busses are run on such lines from the down-town districts of several large cities to nearby suburbs at relatively high rates of fare. Express service is given and intermediate stops are not made to receive or discharge passengers.

The semi-sightseeing type of motor bus made popular on the boulevards of New York and Chicago by the bus companies operating there is provided now by electric railways for their subsidiaries in a number of cities, including Philadelphia, Los Angeles, St. Louis and Detroit. This type of service is provided through the operation of double-deck busses which attract those who are riding for pleasure.

There have been a number of instances where urban electric railways have abandoned their railway operations and substituted motor busses for street cars. This step has been taken, usually because of light traffic, expiring franchises, or high street paving charges to be met. It usually occurs in communities where street congestion does not limit the use of the private automobile. However, in the case of Newburgh, New York, the railway was handicapped by having to operate a single track line through a street that was too narrow to permit double tracking.

Service was so handicapped by street congestion that it was thought expedient to turn to the more flexible bus service when the street railway franchise expired.

A unique type of hybrid motor-railway operation that has been used to solve the extension problem is the "trackless trolley" bus or "railless street car." This vehicle is an electric bus taking its power from an overhead double trolley system. There are several installations in successful operation in cities of the United States and a few in Canadian cities. Limitations in speed, due to danger of "dewirement," and the high cost of the overhead wire system have tended to restrict the adoption of this type of equipment to places where mass transportation at low rates presents a problem to be solved.

Interurban Passenger Service

The widest use of busses by electric railways has been in the interurban service. Many of the interurban electric lines have found busses a great aid as extensions and feeders into districts outside the cities or towns on their routes. These extensions and feeders have developed traffic for the electric railways, promoted goodwill, and advertised the electric lines. Most of these motor installations in the interurban service are operated by the electric railways directly, and it is the consensus of opinion of electric railway men that many of these bus operations, although barely paying operating expenses, produce indirect benefits which make their use profitable.

Among the lines operating such services with marked success are the Chicago, North Shore and Milwaukee; the Interstate Public Service Company; the Trenton and Mercer County Railway; and the West Chester Street Railway. The last named company operating a bus system over a mileage greater than that of its railway. The West Chester Street Railway and the Milwaukee Electric Rail-

way and Light Company are examples of lines operating busses through subsidiary companies, although the management of the bus properties is controlled by the electric railway managers. In addition to running its own busses, the Interstate Public Service Company has established through traffic arrangements and joint fares with several independent motor truck operators who act as feeders to the rail line. Many other companies also find this plan of operation advantageous.

Several prominent electric railway companies operate long distance *de luxe* intercity services. The Chicago, North Shore and Milwaukee has such service between Chicago and Milwaukee. The Philadelphia Rapid Transit operates (for the Pennsylvania Railroad) from Philadelphia to New York, Washington, Baltimore, and Atlantic City, as well as a number of shorter interurban routes of its own. The North Shore Line from Chicago to Milwaukee entered this service to protect itself from independent motor bus competition. The Philadelphia Rapid Transit Company, however, had no electric railway lines operating into the territories in which motor service was established. It has sold its busses to the Pennsylvania Railroad Company.

Several electric railway companies, including the Chicago, North Shore and Milwaukee and the Philadelphia Rapid Transit Company, operate regular all-expense tours, of from two days to a week in duration. This type of service is effective advertising for the companies. In some cases the tours are run through the territory served by the electric railway, while in others the tours extend the electric railway service. These companies also provide special party busses which are leased to parties for periods of time.

Electric interurban railways and, in some instances, urban lines, have replaced electric cars entirely with busses.

One company, the Aurora, Plainfield and Joliet Railway, operating in northern Illinois, is a typical example. This company had several franchises expire in towns along its route and could not get them renewed without incurring heavy paving charges. The electric railway line was abandoned and motor busses substituted.

An unusual use of busses has been made by the Detroit United Traction, which operates a system of interurban lines radiating from the city of Detroit. The cars formerly ran into the city over the tracks of the Detroit Municipal Railway. The interurban cars were subject to delay within the city due to the congestion of the streets over which they were operated. The faster interurbans could not run around the local city street cars. The interurban company built large transfer stations at the points where the lines joined the city line's tracks. Motor busses are operated from these stations to the company's down-town waiting rooms. By this method of operation, expensive payments for trackage rights have been eliminated and the interurban cars have been released to give more remunerative additional service on their own lines. These cars are operated at a scheduled speed of nearly thirty miles per hour in interurban service, while less than ten miles per hour was the average in the city due to street car congestion.

The most extensive use of interurban busses, however, has been in the operation of parallel motor and rail services. This plan of coördination is used to eliminate competition, to maintain control of the territory served, to improve the quality of service, and to reduce operating expenses. A number of railways established motor service, or alternating motor-railway service, in order to forestall competition. Other electric railways have bought out independent motor bus lines already in the competitive field. The combined schedules are staggered by alternating busses and electric

cars so that the public is given an improved service. Headways between cars and busses have usually been reduced by this plan. In some cases the busses are used to give a more convenient service to sections that are not adequately served by the railway line, or the busses may use short cuts over other highways in order to reduce running time and to vary the route so as to take in a new section. Many bus installations use the same highway as the electric cars or highways that parallel the electric tracks a short distance on either side. The Detroit United, the North Shore Line, the Interstate Public Service, and many other railways in various parts of the United States operate such services, as auxiliary or supplementary services.

The extent to which electric railways are using busses in their operations may be summarized as follows:

Electric lines operating motor busses, Jan. 1, 1929	365
Busses in service, Jan. 1, 1929	9,900
Miles of bus line routes operated by electric railways, January 1, 1929 (estimated)	22,000

Motor-Electric Railway Freight Services

Many electric lines that carry freight have coördinated motor truck and electric railway freight services. One of the spheres in which the motor truck has been of the greatest benefit is the terminal district in and about large cities. Here motor trucks are used by the steam railway for the transfer of freight to off-line depots, or for store-door delivery. The first use allows a railway, which may have been deprived by franchise restrictions or by operating difficulties of an entrance to a centrally located freight terminal, to place a station in a central location where it may compete with all other transportation facilities serving the district. Store-door delivery and pick-up service have been used as a means of increasing the attractiveness of electric railway freight service.

One of the earliest railroads, steam or electric, to adopt the use of trucks was the Chicago, North Shore and Milwaukee. This company maintains a down-town passenger station which it reaches by using the elevated railway tracks into the Loop district in Chicago, but of course it was impossible to operate a freight service over this route. In 1920, the company established an off-track down-town freight station in Chicago, and freight was hauled by motor equipment between this station and the railway terminal in an outlying section of the city. Tractors with semi-trailers are used, allowing the release of the motive power while trailers are being loaded and unloaded. Since 1920, several additional off-line stations have been established in the various industrial districts of Chicago in order to meet the requirements of these sections.

A year later, a small electric railway line in Ohio—the Cincinnati, Lawrenceburg and Aurora Railway—operating from the outskirts of Cincinnati to Lawrenceburg and Aurora, Indiana, and other towns nearby, installed a package freight service between these points. The railway company had no track entrance to Cincinnati, since the street railway used broad-gauge track, and the Cincinnati, Lawrenceburg and Aurora operated on standard gauge. A contract was entered into by the electric railway and the Cincinnati Motor Terminals Company under the terms of which the Terminals Company leased to the electric railway the container truck bodies which were also used in the transfer service in connection with the seven steam railroads serving Cincinnati. Hauling service between the electric railway terminal and a down-town freight station was provided by the Motor Terminals Company. The railway company equipped a passenger car to haul two of the trailer bodies and an old single-truck car to carry a third trailer body. The use of the container obviated the necessity of transferring the goods from the motor

trucks to the railway cars at the railway terminal. The bodies are transferred by a crane from car to truck and from truck to car. This service has since been discontinued.

In both of the instances cited above, the electric railways operated the off-line stations and billed the freight through on local waybills. The trucking was performed by the railway itself in one instance, and by a contract haulage agent in the other.

The Lehigh Valley Transit Company, operating in eastern Pennsylvania, obtained its in-city terminals by a joint tariff and service arrangement. This company connects the various important industrial centers in the Lehigh Valley, including Allentown, Bethlehem, Easton and Philadelphia. Passenger trains reach Philadelphia via Norristown, Pennsylvania, over the tracks of the Philadelphia and Western Railway. Freight is brought over the electric railway company's tracks to Erdenheim, Pennsylvania, about twelve miles from the center of Philadelphia. Shippers using the Lehigh Valley Transit Company's freight service were obliged to truck their freight from or to Erdenheim, until a through billing arrangement was entered into with the Terminal Warehouse Company of Philadelphia, whereby the latter company accepted freight for the Lehigh Valley Transit points at one of its warehouses in the down-town district in Philadelphia and trucked it to Erdenheim. Inbound freight is likewise hauled by motor, by the Warehouse Company, from the electric railway terminal to the city warehouses and delivered there to consignees. The Terminal Warehouse Company receives a division of the through rate as its compensation.

In addition to the three ways by which electric railways may obtain the use of down-town terminals through the use of motor trucks—by operation of trucks themselves, by contracting with haulage companies for truck-

ing service, or by joint traffic agreement—they have employed other devices to attract or retain traffic where competition is unusually severe. A well-located downtown terminal is often not sufficient to attract a fair share of the traffic to the electric railways. The motor truck lines usually pick up and deliver, at least within a "free zone," and it is necessary in such cases that the electric railway give a similar service. Electric railway rates are usually low enough to permit a small charge being made for this service without having the rates via electric railway freight service equal or exceed those by motor. The Western Ohio Railway and its immediate connections, the Dayton and Troy Railway, and the Toledo, Findlay and Southern, are examples of roads giving such a service. They operate their own motor trucks at Dayton, Troy, Lima, Fostoria and Findlay, Ohio. A flat rate per 100 pounds is charged for either the pick-up or delivery service in addition to the line-haul railway freight charge. In some cases delivery and pick-up zones are established and graded rates charged for the service depending upon the distance the goods are hauled. Freight is carried by the motor truck between shippers' and consignees' warehouses in these zones, and the electric railway freight depots. Line-haul service is given by the railway.

A somewhat different plan of store-door service is performed by an electric railway in western Pennsylvania. The towns served by this line are small communities spaced at irregular intervals, and many of the consignees and shippers in a town are located on one street, the street on which the tracks lie. Store-door delivery had always been made direct from the cars, but the increase in motor traffic on the narrow highways made it impossible to stop the electric railway cars at each shipper's or consignee's place of business to load or unload freight. The cars sometimes had to be stopped several times in the same block for

loading or unloading, and this delayed street traffic and increased congestion.

There were no suitable sites in any of the towns available at reasonable prices for centrally located freight stations. An outlying freight station was therefore built by the electric railway in each of the towns, and contracts were made with local trucking companies to collect and deliver goods. The trucking companies are paid a percentage of the freight rate in order to stimulate their solicitation of business. Congestion of the streets has been reduced and delays to passenger cars eliminated, the trucks being loaded and unloaded at the curb out of the way of traffic. The freight is billed at the rates published in a local railway tariff as was done before the use of motor vehicles.

A number of electric railways, in addition to using motor trucks in the terminal area, have found them of great aid in interurban haulage. Electric lines can thus handle freight economically in small lots, without restricting their track capacity for other services. A paralleling or substitute motor service similar to those established by several railroads is not generally used by electric railways. The intercity use of freight trucks by electric railways, thus far, has been in making extensions of service into territories not reached directly by the rails. Electric railway companies do not themselves, as a rule, operate these intercity freight trucks as they do intercity passenger busses, but interline agreements for through billing and through rates are made by electric railway and motor freight lines. Contracts are made with independent motor truck operators to give through service between towns not on the lines of the electric railways.

The electric railways have gone far in recognizing the motor truck and bus as new agencies of transportation. In the absorption of motor service into their operations, the electric railways have outstripped the steam railroads

of this country, and the electric lines generally are turning the bus and the truck to their advantage and profit while improving their services. Indeed, the motor has done much to improve the service and financial position of many electric railway properties. It has an important place in coöperation with the electric railway of the present day, and perhaps will play a greater rôle in the future.

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CHAPTER XVII

STEAMSHIP-MOTOR COÖRDINATED SERVICES

Steamship lines have but recently established coördinated motor-steamship freight and passenger services, although the use of motor trucks in conjunction with steamship operation is not a recent innovation. Motors have for many years been used to dray freight to and from steamship docks on an unorganized basis, but the organized coöperation of the two carriers is a very recent type of freight service coördination. The success of the plan, judging from the experience of typical operations, is assured, although it may reasonably be expected that installations will be gradual.

The steamship lines having coördinated motor services transport less-than-carload shipments from terminal to terminal by steamer, and call for and deliver freight, using their own trucks or those of companies with which they make contracts in the terminal ports. The aims of the services are primarily to relieve congestion at terminals and piers through the elimination of vehicle delays and the prevention of the accumulation of freight on the piers. The coördinated service provides shippers and consignees with more prompt steamship freight service, which is often a real saving to them. The service is rendered at rates that are often less than the expense incurred by the trader in using his own trucks.

The efficient use of terminal and port facilities required close coördination of motor truck with water facilities in order to expedite the movement of goods through the terminals.

The Bush Line Coördinated Freight Service

A typical and successful plan of motor-steamship coordination in the inland waterway freight service is that of the Bush Line, operating on the Delaware River between Philadelphia, Pennsylvania; Wilmington, Delaware; and Pennsgrove, New Jersey. This plan has been in operation for a number of years and has built up an efficient organization to perform fast steamboat-motor truck service in portions of four eastern states. From the Wilmington terminal the company operates its own trucks, a fleet of Bush Line trucks performing store-door delivery and collection, serving points in the states of Delaware, Maryland, New Jersey and Pennsylvania adjacent to Wilmington. The charge for this service is included in the through water-motor rate quoted to shippers and consignees.

The Bush Line has a contract with an independent trucking company operating in Philadelphia and vicinity to make deliveries at a fixed rate per 100 pounds. Deliveries are made by motor not only to consignees in Philadelphia, the northern terminus of the line, but also in certain special instances, to points as far from Philadelphia as New York City.

A few of the representative rates of the line for steamship-motor freight service are shown in Figure 29.[1]

The Wilson Line Service

Another steamship company performing coördinated steamship-motor service is the Wilson Line. Its operations were started later than those of the Bush Line but are similar. The store-door pick-up and delivery service is confined to Wilmington, where the company operates its own motor trucks. When the shipments require deliveries to be made in Philadelphia, the Wilson Line contracts with

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[1] See Bush Line Freight Rate Tariff, No. 128.

TABLE XXIV

Class Rates from Philadelphia to Points Shown Below

Rates in Cents per Hundred Pounds; Governed by the Official Classification

Classes	1	2	3	4	5	6	R25	R26	Minimum Charge
Delaware									
* Dover	63	52½	42	35½	28	24	45	35½	50
* Middletown	52½	46	35½	31½	25	24	39	31½	50
* New Castle	32	28	24	22	20	20	24	22	40
* Newark	38	30	38	19½	17	14½	28	22½	40
Wilmington	20	17	15	14	11	10	15	14	25
Maryland									
* Elkton	47	39	32	22	20	20	34	26	50
* Havre De Grace	49	43	34	24	23	21	37	27	50
New Jersey									
Deepwater Point and Carney's Point	26	22	18	16	14	13	18	16	30
Thompson's Point and Gibbstown	20	17	15	14	11	10	15	14	25
Pennsylvania									
* Avondale	39	32	30	22	20	20	30	24	50
* Kennett Square	39	32	30	22	20	20	30	24	50
* West Grove	39	32	30	22	20	20	30	24	50
* Marcus Hook	30	27	25	24	21	20	25	24	35

* Rates so designated include store-door delivery service from Wilmington, Delaware. Other rates include no motor delivery service.

a local trucking company there which is paid for "time" at a fixed price per hour. Through steamship and motor freight rates are quoted shippers and consignees.

Coastwise Express Service of the Merchants and Miners Transportation Company

The Merchants and Miners Transportation Company was established in 1852 by interests of Baltimore and Boston to engage in the coastwise steamship business between Baltimore, Norfolk and Boston. In 1859 the service was extended to include Providence and later Savannah. At the present time this company is operating the following coastwise steamship routes: between Baltimore and Norfolk and Boston; Baltimore and Norfolk and Providence; Baltimore and Savannah and Jacksonville; Philadelphia and Boston; Philadelphia and Savannah and Jacksonville; Philadelphia and Miami; Savannah and Miami. Store-door delivery and collection service was instituted in 1922 by the Merchants and Miners by the establishment of the Coastwise Express, the purposes being to provide a more convenient means of handling freight by steamship and to offset the disadvantage under which every steamship line operates because of the location of its piers. While railroads usually have freight stations in every important industrial section of the cities, the steamship companies have only their own piers which may be far from the plants of certain shippers and consignees. Delivery and pick-up by motor truck brings the steamship service within reach of every shipper. Motor trucks meet the steamers upon their arrival at the ports and deliver freight to the consignees' places of business at steamship-motor rates provided for in tariff circulars of the company.

When a steamer docks at Philadelphia at 7 A.M. the merchandise freight, consigned to the care of the Coastwise Express, is promptly taken from it and loaded in

trucks which cover routes in Philadelphia and cities in New Jersey. Deliveries are made every second morning between Boston and Philadelphia; Boston and Norfolk; every third morning between Boston and Baltimore, with one additional day to interior points through these ports.

For this service the Coastwise Express Company adds to the port-to-port steamship rate a cartage charge that is quoted in the through freight rate, making it a little higher than the flat dock-to-dock steamship tariff. The company has a number of its own trucks and also employs independent trucking agencies, paying them, in most instances, a fixed rate per 100 pounds for delivery service.

There are through rates by all-water, and also by water-and-rail routes between points of origin and destination not served directly by the steamship line, including store-door delivery or pick-up at the ports at which motor delivery service is maintained. Cartage charges are made by zones, increasing by zones beyond the one nearest the piers of the company. For example, a rate of 73½ cents, first class, is made between the dock of the Merchants and Miners Transportation Company, Philadelphia, and store doors of consignees in Boston; 80½ cents on the same traffic between shippers' places of business in Zone 1 in Philadelphia and consignees' store doors in Boston; and 85½ cents between shippers' places of business in Zone 2, Philadelphia, and consignees' warehouses in Boston. The table of rates shown in Figure 30 is compiled from those published by the Coastwise Express. It illustrates the principle followed in making through motor-water rates. Representative motor-steamship-rail rates between selected points served by the Merchants and Miners Transportation Company and its rail and motor freight connections are shown in Table XXIV.[2]

[2] See circular No. 19, Coastwise Express Company, issued by Alan W. Graves, Manager, Baltimore, Md., April, 1926.

Los Angeles Steamship Company Service

Coördinated motor-steamship freight service was inaugurated by the Los Angeles Steamship Company in 1925. In its announcement of the service, the company stated that the purpose was to relieve congestion at the piers. The steamship line, in addition to transporting less-than-carload shipments of freight from terminal to terminal, also delivers freight, through trucking companies, to the consignees' doors and at rates lower than would be the sum of the steamship rates and the cost of drayage if the consignees' own trucks handled the shipments. Instead of each consignee sending his truck or having a drayage company pick up the goods, the trucking company, participating with the steamship carrier, delivers the consignments to each concern's place of business. Pick-ups are made in the same

TABLE XXV

JOINT MOTOR-STEAMSHIP CLASS RATES

Rates in Cents per Hundred Pounds; Governed by the Official Classification

Between	Philadelphia, Pa.*			Baltimore, Md.†		
	Wharf Class I	Zone 1 Class I	Zone 2 Class I	Wharf Class I	Zone 1 Class I	Zone 2 Class I
Boston (store-door) ..	73½	80½	85½	85	90	93
Concord, N. H.	120	127	132	131½	136½	139½
Fall River, Mass. ...	114½	121½	126½	126	131	134
Lowell, Mass.	99½	106½	111½	111	116	119
Providence, R. I.	114½	121½	126½	83	88	91
Worcester, Mass.	134½	141½	146½	146	151	154

* Philadelphia; Zone 1. Covers principal business district bounded by Delaware River, Schuylkill River, Girard Avenue, and Snyder Avenue. Zone 2. Covers district beyond Zone 1.

† Baltimore; Zone 1. Covers the principal business district bounded by Patterson Park Avenue, Fulton Avenue, North Avenue, and Fort Avenue. Zone 2. Covers district beyond Zone 1.

TABLE XXVI *

MOTOR-STEAMSHIP AND RAILROAD COMBINATION RATES
(FIRST CLASS)

Rates in Cents per Hundred Pounds; Governed by the Official Classification

Between Boston, Mass., and Store Door	Class I	Class I
Allentown, Pa.	115	125
Camden, N. J.	75½	85½
Easton, Pa.	175	125
Frederick, Md.	106	116
Millville, N. J.	102	112
Roebling, N. J.	95	105
West Chester, Pa. ...	100	110
Washington, D. C. ..	115	125

* Compiled from Circular No. 19, Coastwise Express Company.

manner. "The experiment of the Los Angeles Steamship Company should have a far-reaching effect, especially on the Pacific Coast. Being an expedited freight express service, it is recommended to shippers who are now given store-door delivery, eliminating drayage charges, or other matters of delivery to the customers' doors."[3]

Motor-Lake Steamship Freight Service

The Detroit and Cleveland Navigation Company makes joint rates via lake steamer and Detroit, between Cleveland, Ohio, and Buffalo, New York, and points in Michigan, a motor-freight service being provided between Detroit and the interior points.

A joint tariff of the Detroit and Cleveland Lake Lines and the Intercity Trucking Service, Incorporated, contains joint lake and highway rates governed by the Official Railroad Classification and by the exceptions to the classifi-

[3] Announcement, Los Angeles Steamship Company.

TABLE XXVII

Store-Door Delivery and Pick-up Rates from or to Merchants and Miners Transportation Company's Piers

To Be Added to Through Water or Rail-Water Rates to the Piers

At	Class Rates in Cents Per Hundred Pounds Governed by the Official Classification						Minimum Charge	
	1	2	3	4	5	6	Class	Shoes
Baltimore, Md.								
Zone 1	6	6	6	6	5½	5½	25c.	15c.
Zone 2	10	10	10	10	9	9	40c.	40c.
Boston, Mass.	11	11	10	9	7½	7½	40c.	...
Providence, R. I.	10	10	10	10	9	9	40c.	
Saylesville, R. I.	10	10	10	10	10	10	75c.	
Philadelphia, Pa.								
Zone 1	9	9	8	8	7	7	35c.	15c.
Zone 2	14	14	13	13	12	12	55c.	40c.
Norfolk, Va.								
Berkley	9	9	9	9	8	8	40c.	...
Portsmouth, Va.	12	12	11	11	10	10	55c.	...
Ocean View, Va.								
Naval Base	17	17	16	16	15	15	$2.05	...
Jacksonville, Fla.	9	9	8	8	7	7	40c.	
Savannah, Ga.	11	11	11	11	10	10	55c.	

cation, which are published by B. T. Jones, as agent, and by supplements and reissues of these publications.[4]

The rates of the Detroit and Cleveland Navigation Company via joint motor-and-rail routes are effective only during the season of lake navigation. Marine insurance is included in the through joint rates. Articles rated lower than fourth class by the Official Classification that are accepted for transportation are charged the fourth class lake and highway rates. A number of explosive, inflammable, or otherwise dangerous or noxious articles are specifically excluded from transportation and numerous other commodities are so restricted as to be handled only upon special authority of the agent of the initial carrier at the point of origin of the shipment.[5]

The table of class rates shown in Table XXVIII is typical of the scale of charges via lake and motor between points in these districts. The minimum charge for the transportation of single shipments is $1.00, except when individual delivery or pick-up service is required, in which case the minimum charge is $1.25 per shipment.

Coördinated Motor Bus and Steamship Services

Several coastwise steamship companies engaged in the passenger business are using motor busses to improve their service and to attract travel. Their services may take the form of a bus line running to the various railroad terminals; of a bus line connecting the port with distant towns, thus extending the terminals of the steamship company; or of motors run in connection with the company's "all expense" tours. In all cases the rates for the motor services are included in the steamship tariffs.

The Merchants and Miners Transportation Company

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[4] B. T. Jones, Agent, I.C.C. No. 1762.

[5] Detroit and Cleveland Navigation Company, Tariff S. B. No. 93, pages 3, 4, and 5.

TABLE XXVIII

TABLE OF CLASS RATES, LAKE AND MOTOR SERVICE GOVERNED BY OFFICIAL CLASSIFICATION

Rates in Cents per Hundred Pounds

Between Buffalo, N. Y., and	Classes					
	I	2	3	4	R25	R26
Howell, Mich.	89	76½	61½	47	66	50
Lansing, Mich.	90½	77½	62½	48	66½	51
Pontiac, Mich. } .... Flint, Mich. }	85½	73½	59	45½	63	48
Wayne, Mich.	83½	71½	57½	44½	61½	47
Ann Arbor, Mich. ..	84	72	58	44½	62	47½
Chelsea, Mich.	85½	73½	59	45½	63	48
Jackson, Mich.	88½	76	61	47	65½	50
Between Cleveland, Ohio, and						
Howell, Mich.	78	67	54	41½	57½	44
Lansing, Mich.	81½	70	56½	43½	60	46
Pontiac, Mich.	79½	68½	55	42½	59	45
Flint, Mich.	81½	70	56½	43½	60	46
Ann Arbor, Mich. ..	70½	60½	49½	38	52	40
Chelsea, Mich.	71½	61½	49½	38½	53	40½
Jackson, Mich.	74	63½	50½	39½	54½	41½

makes use of motor busses and features the "all expense" tour, the charges for which include steamer, hotel, sightseeing and motor or rail transportation. A typical "all expense" tour is that from Baltimore to New York, Montreal, Quebec, Saguenay and Boston. The trip is made in nine days at a cost of $143.00. The company has a contract with motor lines in several cities, sightseeing by busses being provided in New York, Boston and elsewhere. The company also arranges for the transfer of passengers from the ship to the hotel by motor bus.

The foregoing statement is sufficient to show that, through the use of motor busses, the steamship lines have improved their services, and extended their "hinterland" by attractive itineraries. They have made travel more convenient for passengers, and have enabled them to enjoy the sightseeing benefits of motoring in a comfortable and economical way, while at the same time relieving the tourist of the delay and trouble of arranging for transportation and hotel accommodations.

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CHAPTER XVIII

THE OBJECTIVES OF COÖRDINATION

THE purpose of all plans of coördinating motor with other transportation agencies is to give to each a place corresponding to its relative efficiency as a carrier. Electric railways, steamships, railroads and motor services are to be so employed that goods may be moved as freely as possible, by coördinated transportation from the factories or warehouses of the shippers to the receiving places of the consignees in other cities without avoidable delays or breaks in the continuity of the movements.

Coördinated transportation does not imply that the development of the use of motors will be stifled nor that motor truck lines must all be taken over and operated by the railroads or by other carriers. Those who fear that the ownership of motor vehicles by other carriers will impair the usefulness of automotive transportation have expressed the belief that what the carriers mean by coördination is that motor trucks should perform only the service that the horse and wagon performed before the advent of the motor vehicle, and that the railroads, electric railways and steamship lines should continue to perform the service they have rendered in the past. Such fears are groundless. The motor vehicle is here and here to stay. The managers of railroads, electric railways and steamship companies realize this as well as shippers and the general public.

Financial Community Interest Is Not Essential to Coördination

The coördination of rail and motor transportation may be brought about without other carriers having any direct

or indirect financial interest in the motor carriers. Joint through rates and services by rail-and-motor routes will do much to establish a satisfactory system of coördination, and can be accomplished without any community of financial control interest between the carriers, just as through rates and routes are now made by joint rail, rail-and-water and joint-water carriers not having common financial interests.

Adequate Public Regulation

The incorporation of motor carriers into a comprehensive articulated transportation system will doubtless lead to their regulation by state and Federal commissions. This is needed to protect the permanent motor carriers from the irresponsible operators who cut rates, offer irregular service, and generally demoralize the business. Competent and impartial public regulation of privately owned public utilities is recognized to be a sound policy. Motor transportation within state boundaries is now quite generally regulated by state public utility commissions, but while interstate railroads, pipe line, express and some other carriers are regulated, interstate motor carriers are not, although there is no logical reason for the policy.

Motor regulation by the Federal Government would not unjustly discriminate against highway transportation nor relegate it to a position of relatively little importance. It would mean that each agency of transportation would be assisted in finding its proper sphere and that each would be protected from unfair competition, from other forms of transportation, from undue influence exacted by powerful shippers, and from the ruthless competition of competitors in the same field. Federal regulation has protected shippers from unfair railroad practices and has protected the carriers from their own folly. The United States has outgrown rebating, rate wars and unfair discriminatory

practices in railroad competition; and the best interests of all, especially those of the public, may be protected by preventing the lethal weapons of commercial warfare being applied to the motor carriers, just as the railroads and other carriers subject to Federal regulation have been safeguarded.

If interstate motor companies were recognized as common carriers, subject to the Interstate Commerce Act, they would stand on an equal footing with other carriers, and could act as competing and connecting parts of a better balanced transportation system. Competition between motor lines and carriers could be put on a fair and suitable basis. Joint services at through rates could be established and the services and combination rates could be regulated by the Interstate Commerce Commission, if in interstate commerce, or by the appropriate state commissions if solely in intrastate commerce.

Regulation, it should be further urged, does not mean the elimination of competition between motor carriers or of motor lines with railroads. In the case of railroads, regulation has eliminated "cut-throat" competition, rebates, unfair discrimination and corrupt practices, but it has stimulated fair rivalry on ethical and sound business bases.

Regulation by the Federal Government does not imply that all of the traffic now carried over the highways by motor would be forced back to the rails. This would be done only if the government regulatory body were convinced that the rates charged by the motor lines were unremunerative and that rates on the same traffic between the same points by railroad were reasonably compensatory. In such cases, this body, doubtless, would forbid the motor carriers to compete for such traffic at less-than-cost rates. The shippers cannot reasonably expect railroad motor carriers to perform transportation services at less than reasonably compensatory rates. Likewise the railroads

would be forbidden to compete destructively with motor lines for such services as motor carriers can perform more economically than the railroads.

Within the past ten years railroad officials have frequently made the statement that the carriage of less-than-carload freight for short distances is done at a loss instead of a profit, and, during and immediately after the World War shippers were not infrequently urged to use motor trucks for short-haul traffic so as not to burden the railroads unduly with this unprofitable sort of business. One result of coördination and regulation would be the retirement of either the railroads or the motor carriers from the fields in which they could not compete with the other at the rates set by the more efficient carrier. This action would result in the advancement of the best interests of the railroads, the motor carriers, and the public.

There are many complex factors to be reckoned with before coördinated freight service becomes an established fact on a large scale in the United States. Many of them have been indicated or discussed in preceding chapters. Others deserve special mention at this point.

In the first place the essential provisions of a plan of coordination must be formulated and they must be thoroughly explained to the general shipping public in order that the support of this group may be obtained. The public must be made to understand that the plan is not an impracticable scheme of visionaries, but that it was in operation on a small scale in the United States in the days of the horse-drawn vehicle; and that the service was discontinued, not because it was impracticable, but because it resulted in unfair discrimination which the carriers were unable in that day to eliminate without extending the service beyond the limits to which they were prepared to go. The success of the plan in Canada and particularly in England must be brought to the attention of the public.

A second obstacle to be overcome is the inertia of some railroads. Many progressive railroad officers already have expressed conviction that a system of organized cartage service or store-door delivery is necessary with the rapid growth of railroad freight traffic, the increase in size of the important cities, and the resulting congestion of railroad terminal yards and city streets. American railroad managements are, as a rule, conservative, and the policy of many roads has been to study the situation carefully before taking any action. However, a number of roads have already started experimentation with terminal freight plans, many of which have store-door delivery as possible goals. The rail carriers for the most part have preferred to have outside concerns perform the local cartage service in the terminals under contract with the railroads, rather than to own and operate their own motor vehicles. They thus avoid investment in motor equipment and the additional responsibility of managing the service themselves. The foremost installations of motor terminal service so far have been by independent motor companies, or by subsidiaries of the rail carrier.

It is immaterial, as far as the interests of the shipping public are concerned, whether the services are performed by the railroads themselves, by subsidiary corporations of the railroads or by independent motor haulage companies. The important thing is the fact of a coördinated service, assuring rapid terminal handling at low rates and with definite responsibility for the safety of the goods from the door of the shipper to the door of the consignee.

A third obstacle in the path of coördinated terminal service is the apathy or antagonism of certain shippers and consignees, many of whom do not fully appreciate the significance of the plan of door-to-door freight service, or who have advantages of location or facilities which they do not wish to have discontinued. Shippers and consignees

have become accustomed to using their own trucks or hiring independent truckers to haul their goods between their warehouses and the freight stations. They are in the habit of sending freight to and collecting it from the freight depots when and as they please and, although they are frequently heard to complain of poor service and slow deliveries they are not eager to revolutionize railroad freight transportation practices which have become a fixed part of business routine.

If business men become convinced of the inefficiency of using motor trucks to a fraction of their capacities to haul goods to and from freight stations, when the same amount of freight could be hauled in fewer trucks, loaded more nearly to their capacities and that freight depots should be used as receiving and delivering facilities and not as warehouses, then the coördinated terminal freight service plans may be expected to make headway.

The Future of Coördinated Terminal Services

The steadily increasing volume of freight traffic, the growth in size of the larger American terminal cities, the rapid increase everywhere in the number of motor vehicles in passenger and freight service, the development of new commercial and industrial districts and the increasing city congestion—all these factors are impelling shippers and carriers toward the coördination of rail, electric railway, steamships and motor freight services, and toward an improved and more efficient transport system.

Constructive legislation and open-minded investigation of the fields of the several types of carriers serving the public are necessary to achieve this goal.

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